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How a Light Work Gray Iron Shop is Equipped

Arrangement of the New Casting Plant Built by the Hamilton Foundry & Machine Co. to Facilitate Production

A third unit for the manufacture of light castings has been added to the plant of the Hamilton Foundry & Machine Co., Hamilton, O. This shop is detached from the other two casting plants operated by this company, and is self-contained in every respect, from the melting of the iron to the cleaning of the castings. Organized in 1891, the Hamilton Foundry & Machine Co. made a general line of castings for the jobbing trade, but after a few years of this practice it was decided to engage in the production of light work only. The plant at that time consisted of one building 50 x 300 feet, the output having aggregated approximately 10,000 pounds daily. In 1906 a second foundry unit was built, and with the completion of the new shop three distinct foundries are operated which in no way are connected with each other.

The new plant is of brick, steel and concrete construction, 60 x 455 feet, and is divided into four departments, including the molding floor, cleaning room, pattern shop and shipping department. An interior view of the foundry is illustrated in Fig. 1 and it will be noted that the plant is unusually well arranged for light work. With the exception of two rows of cast iron columns to support the roof, the floor is practically unobstructed. A wide mashway in the center facilitates the distribution of the iron. Rows of windows extend the length of both sides of the shop, providing

FIG. 1—THE NEW LIGHT WORK SHOP RECENTLY ADDED TO THE PLANT OF THE HAMILTON FOUNDRY & MACHINE CO., HAMILTON, O.

FIG. 2—A SECTION OF THE MACHINE MOLDING FLOOR

ample light and ventilation. The cupolas, charging floor and blower room are located in a building 25 feet square adjoining the center of one side of the shop, as shown in the ground plan, Fig. 5. Molding machine operations are limited to one side of the plant while bench molding operations are carried on on the opposite side. Thirty 10-inch Mumford power-ramming machines have been installed, and 35 benches have been provided for hand molding. The molding machine floors are approximately 12 feet wide, which insures ample space for placing the molds for pouring. The bench floors, on the other hand, are approximately 10 feet wide.

Distribution of the Iron

Extending the length of the shop is an overhead track from which bails are suspended to facilitate the distribution of the ladles of iron to the various floors. This track is clearly shown in Fig. 1. The sand is prepared by a sand-cutting machine installed by the Sand Mixing Machine Co., New York. This machine is electrically-operated and electric plugs have been provided at intervals throughout the shop to permit of its operation on the various floors.

Melting Equipment

The melting equipment consists of two Whiting cupolas, Nos. 5 and 7, respectively, the larger furnace being used daily while the smaller cupola is held in reserve. The blast is furnished by a No. 5 Connersville blower, installed by the Connersville Blower Co., Connersville, Ind. The charging floor is served by a 4,000-pound capacity elevator. Although the plant is 455 feet long, a section at one end, 60 feet long, is partitioned off for the cleaning department, pattern shop and shipping room. This reduces the size of the foundry floor to 395 x 60 feet. The cleaning room is 20 x 27 feet, and is equipped with eight exhaust tumbling barrels installed by the W. W. Sly Mfg. Co., Cleveland. The barrels are electrically-operated and the dust is carried off by a dust-collecting system. The pattern shop is 20 x 27 feet and is well-equipped with a complete line of patternmaking and woodworking machines. The shipping room, which occupies the north end of the building, is 40 x 60 feet. An average of 90 men are employed in this new addition and the daily melt approximates 25 tons.

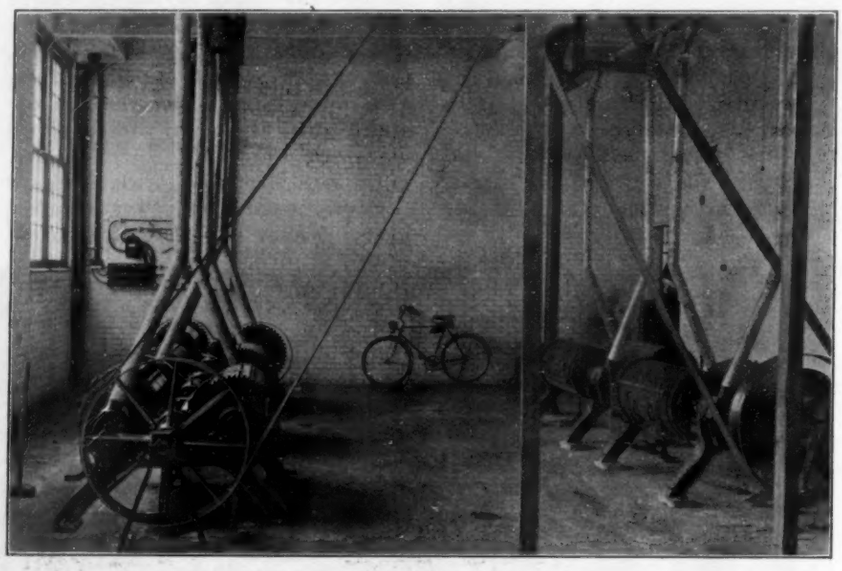


FIG. 4—THE CLEANING ROOM

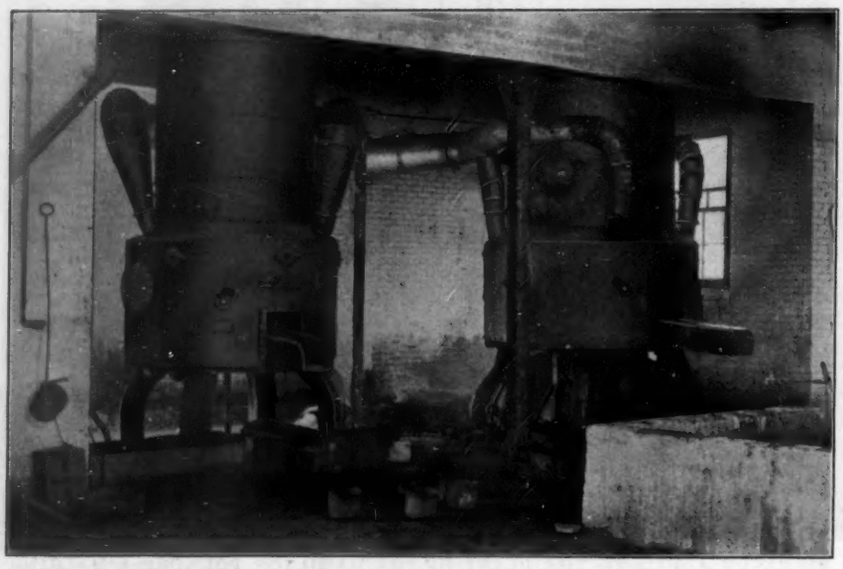


FIG. 3—THE TWO CUPOLAS

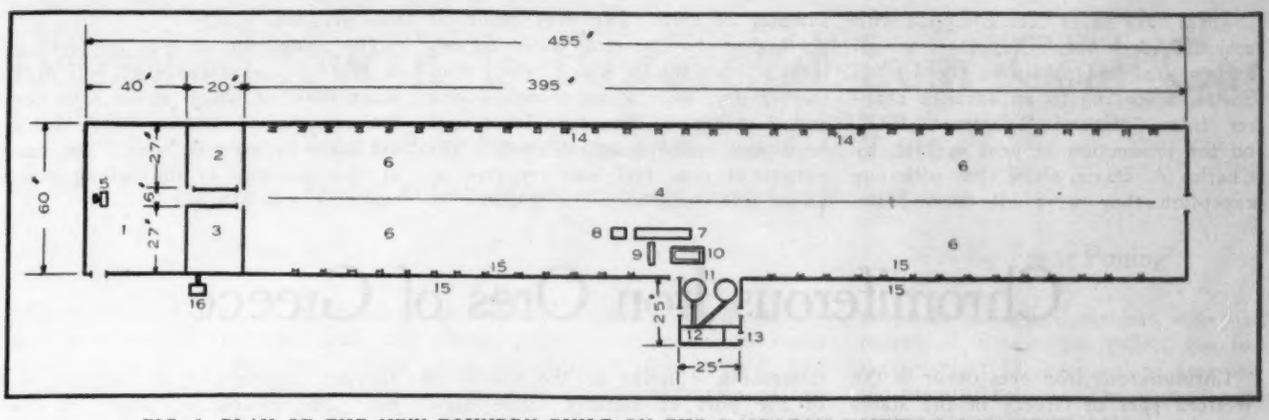


FIG. 5—PLAN OF THE NEW FOUNDRY BUILT BY THE HAMILTON FOUNDRY & MACHINE CO.

No. 1, shipping room; 2, cleaning room; 3, pattern shop; 4, overhead track; 5, scales; 6, main foundry floor; 7, core bench; 8, core oven; 9, core rack; 10, tank; 11, the two cupolas; 12, blower room; 13, charging floor elevator; 14, molding machines; 15, molding benches; 16, dust arrester

Duplex Car Box Boring Machine

The Detrick & Harvey Machine Co., Baltimore, is now building a duplex car box boring machine, the bed of which is of the double shear type and of sufficient length to bore and face car boxes, 6 inches in diameter and 12 inches long. The bed is 45¾ inches wide. The distance of the headstocks from the top of the shears through the center of the spindle bearings, is 13 inches. The spindles are made of cast iron, 4¼ inches in diameter, and have a 17-inch bearing in the headstock. Sliding toothed steel clutches, keyed to the spindle and actuated by an eccentric lever, engage and disengage steel toothed sleeves, which revolve loose on the spindles. The boring bars are 3-11/16 inches in diameter and are employed for boring boxes, 5 inches in diameter and larger. The bars are secured to the end of the spindle in sockets, being supported at the opposite end by bearings and can be operated simultaneously or independently, as desired. The carriages are fitted to the inner locks of the shears, on which they have a sliding motion, either hand or power-actuated. The quick hand motion is effected by a spider and rack, the slow hand motion by a hand wheel on the end of the screw and the power feeds by spur gear at the end of the bed furthest from the headstock. Each carriage is equipped with a square, locked cross slide, upon which two slides are fitted, being adjusted to and from the line of the center of the spindle by a right and left hand screw. Slides are provided to support gripping jaws for holding the car boxes. The feed screws are 1¾ inches in diameter and are located under the carriages and in the center of each shear. The change gears are located at the end of the machine furthest from the headstock and the motion to the feed mechanisms is taken from each respective spindle, so that the feed is in action only when the spindles revolve. The feeds to the carriage are 1/16 to 1/8 inch and 3/16 inches per revolution of spindle. The latter are driven by a 12½-horsepower motor, mounted on a base attached to the frame. The motor has a speed variation of one to two, imparting spindle speeds from 25 to 50 revolutions per minute.

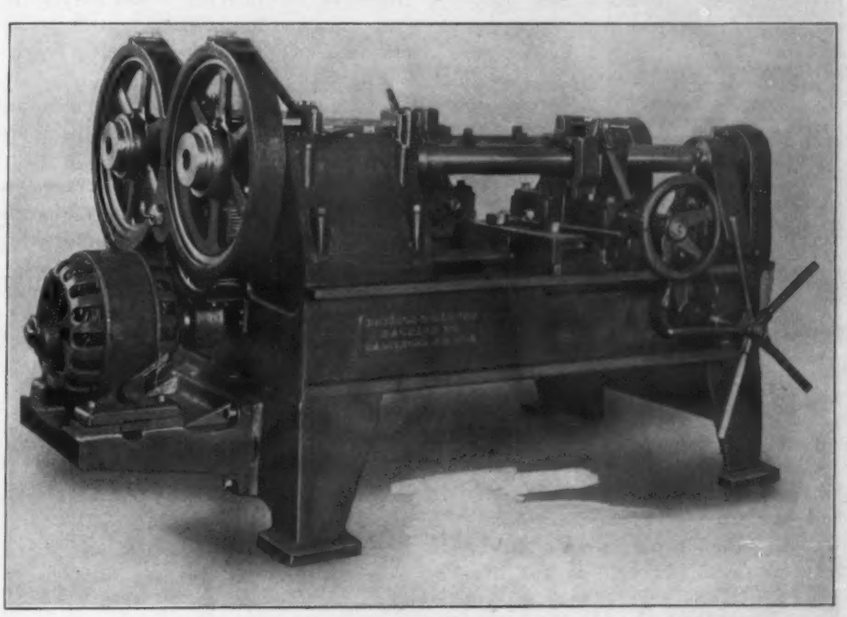
A method of recovering zinc and copper from brass waste is the subject of a patent granted to Harvey M. Burkey, Newark, N. J. The brass turnings are mixed with finely-divided fuel, such as anthracite coal, and are subjected to an oxidizing blast in a converter of the Huntington-Heberlein type. The temperature and volume of air are so regulated that the zinc is oxidized, volatilized and collected in a suitable system of bags, while the copper remains behind as a sinter which can be charged directly into a reverberatory furnace and refined.

Edge Protectors for Castings

In the article describing edge protectors for handling castings, published on page 382 of the Aug. 28 issue of THE IRON TRADE REVIEW, a statement was made that "these protectors are made of low carbon cast iron and can be subjected to severe service". The Hess Steel Castings Co., Bridgeton, N. J., manufacturer of these protectors, states, however, that these protectors are made of a very low carbon alloy which is practically pure wrought iron.

Peat Production Small

While the United States is the richest country in the world in the deposits of peat, little active work is done in mining or digging it and so far as is known very few of the peat-fuel plants established have gone beyond the experimental stage and many



DETRICK & HARVEY DUPLEX CAR BORING MACHINE

of them have never been equipped with essential machinery. Reports from all known peat-fuel plants in the United States, according to an advance chapter from "Mineral Resources, 1912", on the production of peat in 1912, by Charles A. Davis, show that with one exception they were idle during the summer of 1912. The only plant reporting production made air-dried cylindrical peat blocks, which, when thoroughly dry, were about 6 inches long and 2 inches in diameter, dense, and hard and stood handling well. The output of peat fuel was reported as about 1,300 tons, valued at $4,550. All this peat was sold.

The production of peat for fertilizer in 1912, so far as reported, was 41,080 short tons, of which about 8,000 tons was reported as sold air-dried, that is, not dried by artificial heat. The value of this material at the selling prices reported was $186,522.

Chromiferous Iron Ores of Greece

Chromiferous iron ores occur in the western part of Greece in the states of Lokris and Boitio, and on the islands of Euboea, Skyros and others of the Grecian archipelago. The most important deposits are located in the district bounded by the drained Lake Copias and the west coast of the Talanta channel. The ore deposits are all within a few miles of the coast, which provides excellent loading ports.

The ore consists of hard grains or shot-like particles and nodules of irregular shape, up to ½ inch in diameter, of brown hematite which has a sub-metallic fracture, associated with a variable quantity of a binder or matrix of a more hydrated, amorphous character.

In the Tsouka and Karditza properties the mineral is quite compact, and bears transport without crumbling, but the greater part of the ore from the Thebes and Lokris deposits, as well as that of Lutzi, disintegrates on handling, and assumes a physical condition which is predjudicial to its use in the blast furnace. The composition of the ore in the dry, of the different deposits varies within the following limits:

	Per cent.
Iron	46.00 to 52.00
Alumina	6.00 to 14.00
Silica	5.00 to 11.00
Chromium	2.00 to 3.00
Nickel and cobalt	0.10 to 1.2
Phosphorus	trace to 0.03
Sulphur	0.02 to 0.05
Titanium	trace to 0.30

By reason of the irregular occurrence of the chromiferous iron ore, it is not possible to estimate the quantity of this mineral in the Greek deposits likely to be available for extraction at a profit. The deposits are, however, so large and well distributed that they will, no doubt, yield a large quantity of mineral for many years, although exploratory work has proved in many of them, notably those of Lokris and Thebes, that the mineral proves to be somewhat poorer in depth, the iron contents being reduced to 45 per cent in the dry ore.

The Lakris and Thebes ore bodies occur on several spurs, separated by deep ravines, of the Scropo Neri mountains, 7 miles to the southwest of the port of Larmes. The highest point of the outcrop is 12,000 feet above sea level and 600 feet above the bed of the extinct Lake Copias.

Will Wash Poor Ore

The mineral on the Thebes concession contains from 40 to 52 per cent of iron in the dry ore. The gradation between the amorphous and pisolitic type is gradual. Ore containing less than 43 per cent of iron in the dry, which is at present rejected, ultimately will be rendered marketable by washing.

The average composition of the mineral in the dry ore from the Thebes and Lokris properties, follows:

	Per cent.
Iron	46.00
Alumina	14.00
Silica	8.00
Chromium	2.50
Nickel and cobalt	0.60
Phosphorus	0.02
Sulphur	0.03

By reason of the disintegration of the more amorphous and friable mineral in cargoes, 50 per cent is classed as lump and rubble, and 50 per cent as fine, powdery ore. Sintering would improve the physical condition of the ore for the blast furnace, and would make a richer mineral by the elimination of the combined water and moisture, but the cost would probably absorb most of the increased value of the product.

The Tsouka ore body averages 10 feet in thickness, and consists of compact hematite either of an amorphous character, or as a conglomerated mass of a pisolitic character. The mineral in the upper part of the deposit is somewhat softer than the rest, but the physical condition of the mineral is excellent for blast furnace. Its average composition in the dry follows:

	Per cent.
Iron	52.00
Alumina	7.00
Silica	7.00
Chromium	2.00
Nickel and cobalt	0.70
Phosphorus	0.01
Sulphur	0.04

The Karditza deposit is 5 miles southwest of the Thebes property and the ore outcrops on the summit of a hill. The mineral is compact in character, and its average composition in the dry follows:

	Per cent.
Iron	50.00
Alumina	6.00
Silica	9.00
Chromium	2.80
Nickel and cobalt	0.15
Phosphorus	0.01
Sulphur	0.05

The principal Skyros deposit is said to occur in the limestone in a manner similar to those of Lokris and Thebes. The mineral has the following composition in the dry:

	Per cent.
Iron	46.00
Alumina	9.50
Silica	11.00
Chromium	2.50
Phosphorus	0.03
Nickel and cobalt	1.00
Sulphur	0.02

By reason of the wide outcrops and steep inclination of the Thebes and Lokris deposits, as well as the favorable topographical conditions for disposal of the waste, the ore has for the most part been obtained by quarrying and milling.

The cost of quarrying the ore at the Thebes and Lokris properties averages 61 cents per ton. At the Tsouka deposit, where the mineral is mined, the cost will be more, probably amounting to 73 cents per ton. The labor available in the district consists for the most part of Albanians, who are paid about 75 cents per day.

The Lokris and Thebes deposits have narrow-gage lines, 8 miles in length, communicating with their loading piers, and the cost of transporting the ore amounts to 24 cents per ton, while the Tsouka property is connected with the port of Hagios Joannis by a ropeway, 5 miles in length, by which the ore is transported at a cost of 8 cents per ton. The Lutzi property also is connected with the port of Tragana by an aerial ropeway.

The total cost, including royalty to the state, of placing the mineral, f. o. b. loading port, is about $1.22 per ton, and the selling price is $1.28 per ton, with 20 cents for loading, thus aggregating a total of $1.46 per ton.

Benzol---How it is Recovered from Coal Gas

What is Being Done Abroad in the Recovery of This By-Product in Coke Manufacture and What Can be Done Here

By Franz Puning[1]

Every process designed to cheapen the conversion of coal into coke affects the cost of pig iron. This conversion originally was accomplished with heavy losses in bee-hive ovens, also in chamber ovens without by-product recovery. Only 40 years ago the first serviceable ovens were built by Carves, in which valuable by-products were recovered from the gas leaving the ovens, before it again returned for heating. The by-products were tar and ammonia, which were converted into ammonium sulphate. In Germany bee-hive ovens have been abandoned, and only a few chamber ovens are in operation without by-product recovery. In the United States it is only a question of time before bee-hive ovens will be abolished.

However, development has not stopped with the recovery of tar and ammonium sulphate, for in modern plants other constituents are recovered, among them being benzol. Germany leads in the installation of benzol plants and today only a few coke plants are operated in Germany without benzol plants in connection.

Profits to be Derived

In this country the time has arrived when a by-product coke oven plant, to be complete, must have a benzol plant in connection with it. The production of a ton of coke requires a certain amount of coal regardless of whether the benzol is or is not extracted from the gas. Therefore, the profits realized in the extraction of benzol can be deducted directly from the cost of the production of coke. According to various tests on American coals, the average benzol recovery would amount to 2 gallons per net ton. As benzol will be used chiefly as a motor fuel, its retail price should be considered the same as that of gasoline, which at present is 18 cents per gallon; but for the producer 15 cents will be assumed the price of benzol. The cost of producing one gallon of benzol, including all overhead charges, amounts to approximately 6 cents per gallon. Consequently the profit realized in the production of benzol from one ton of coke is equal to 1.35 tons of coal $\times$ 2 gallons $\times$ 9 cents $=$ 24 cents.

Considering the steady demand for gasoline, the profit to be derived from a benzol plant is assured. The amount of motor fuel that can be produced in this way is large. The number of by-product coke ovens in the United States is about 6,200, with a total annual consumption of 14,800,000 net tons of coal. If the benzol in this coal were recovered the annual production would amount to 29,600,000 gallons, valued at $4,440,000.

Benzol is one of the hydro-carbon compounds which, during the dry dis-

[1]Mechanical Engineer, H. Koppers Co., Chicago.

FIG. 1—BENZOL RECTIFYING AND PURIFYING PLANT AT THE RHEINPREUSSEN COLLIERY, GERMANY

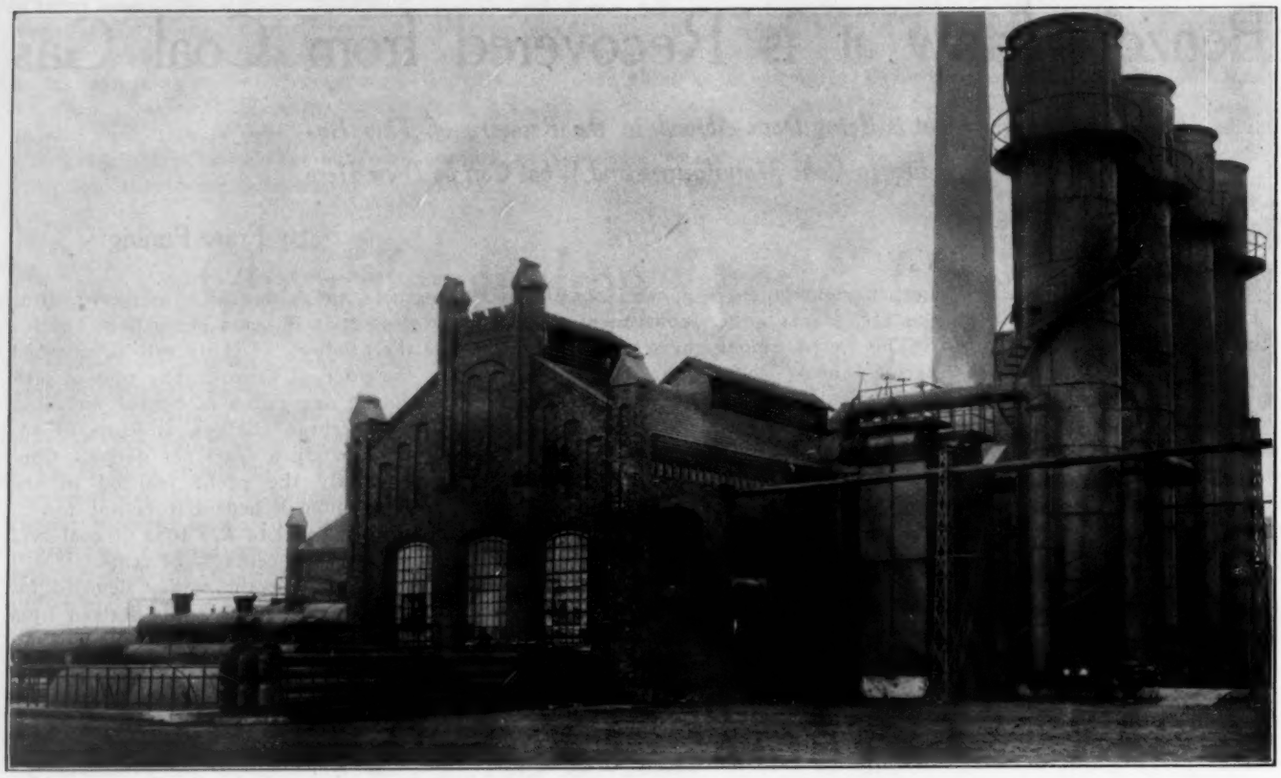


FIG. 2—LIGHT OIL RECOVERY PLANT FOR 130 OVENS AT THE RHEINPREUSSEN COLLIERY

tillation of coal, escapes from the ovens together with the gas evolved. Most of the hydro-carbons are high volatile compounds and are condensed on cooling the gas, while benzol, a low volatile compound, remains in the gas even at a temperature of 60 degrees Fahr. However, about 5 per cent of the total benzol evolved from the coal is dissolved and absorbed by the condensing high volatile oils which form a large part of the produced tar.

Closely related to benzol are the following hydro-carbons: Toluol, xylol and some other higher boiling hydro-carbon compounds, the exact combination of which is known only partially, and they are classified under the general term, *solvent-naphtha*. All these products are called homologues of benzol. They are, like benzol, contained in the volatile parts of the coal and remain in suspension in the evolved gas. However, the amount of benzol is two to three times as great as the combined amounts of toluol, xylol and solvent-naphtha.

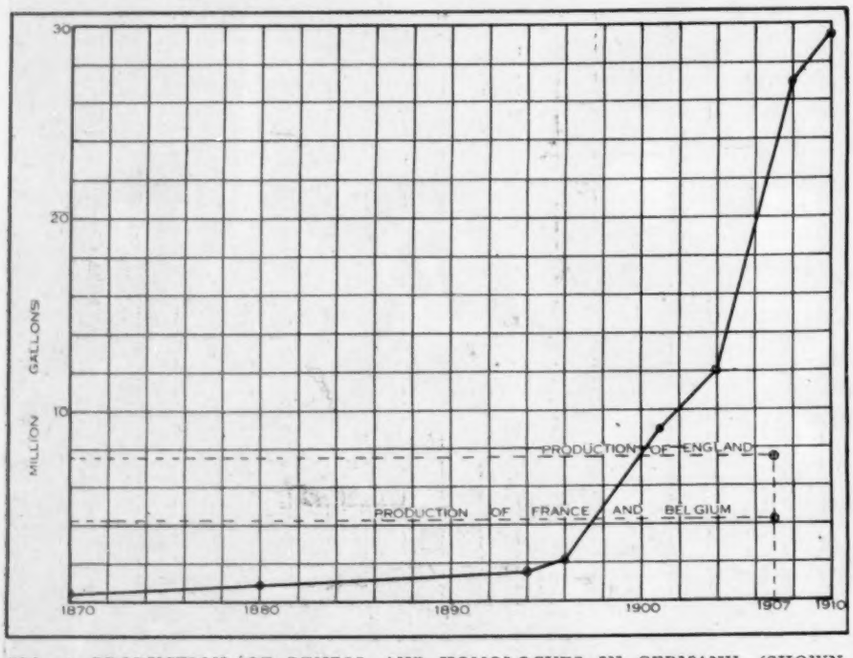


FIG. 3—PRODUCTION OF BENZOL AND HOMOLOGUES IN GERMANY, (SHOWN BY HEAVY LINE), ENGLAND, FRANCE AND BELGIUM

Benzol, $C_6 H_6$, is similar to gasoline, being fluid and colorless, with an inoffensive odor. The specific gravity is 0.88, boiling point 191 degrees Fahr., flashing point, according to Abel, 17.6 degrees Fahr. It solidifies at 32 degrees Fahr., forming large, rombic crystals, which melt at 37.4 degrees Fahr. It is insoluble in water, burns with a luminous, sooty flame and dissolves fat, etherial oils, rubber, camphor, etc.

Toluol, $C_6 H_5 CH_3$, is closely related to benzol and cannot be distinguished from it by its appearance. Its boiling point is 230 degrees Fahr., specific gravity 0.87 and freezing point 130 degrees Fahr.

Xylol, $C_6 H_4 (CH_3)_2$, or better expressed xylols, consists of 3 isomere xylols, having boiling points of 278.6, 282.2 and 287.6 degrees Fahr., respectively. These three xylols cannot be separated by distillation. All are colorless and have the same appearance as benzol. The specific gravity of xylol is 0.87.

Solvent-naphtha is a mixture of different hydro-carbon compounds of which most combinations are not known as yet. It receives its name from its high solvent effect on rubber. Its specific gravity is 0.87 and its boil-

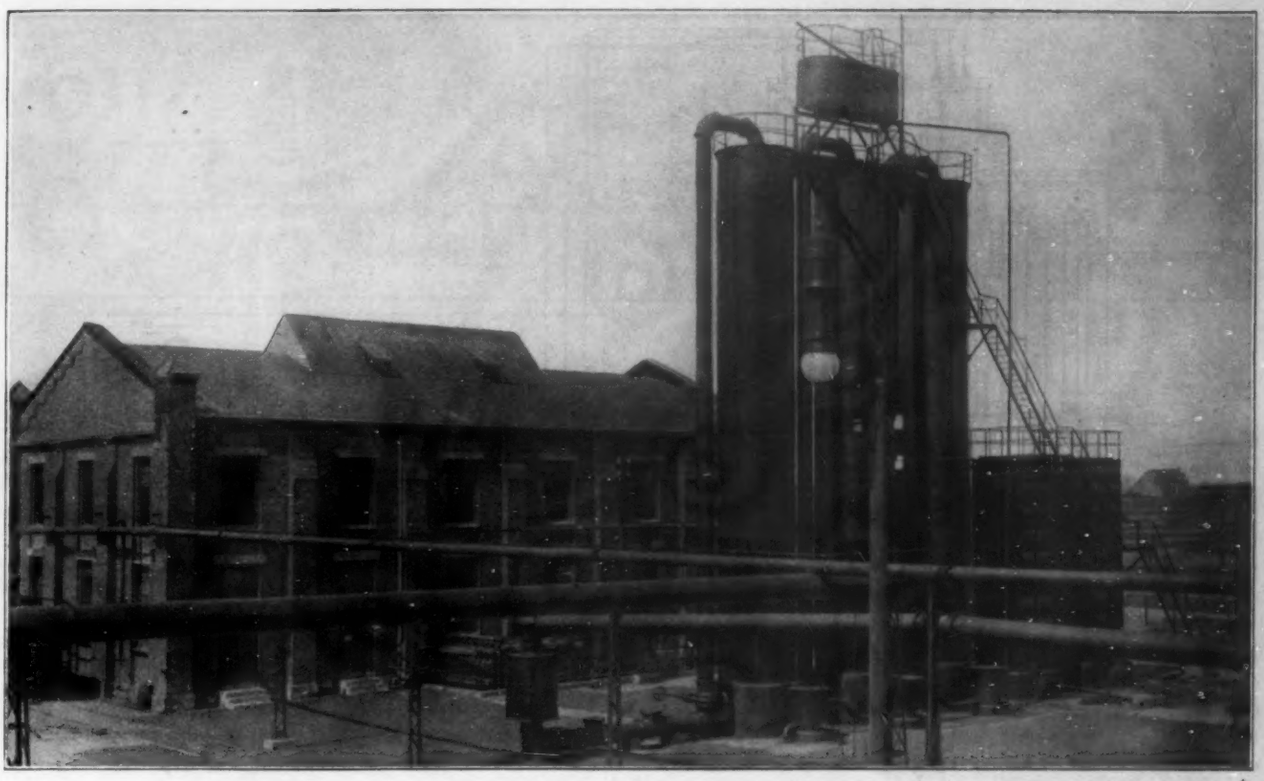


FIG. 4—BENZOL RECOVERY AND PURIFYING PLANT FOR 120 OVENS AT THE DE WENDEL COLLIERY, GERMANY

ing point ranges from 302 to 356 degrees Fahr.

These characteristics are true only for chemically pure products. The commercial products made by by-product recovery plants are more or less impure and represent to a large extent mixtures of these hydro-carbon combinations. This is due to the fact that the benzol and its homologues are present in the gas or in the tar as a mixture and are recovered as a mixture. They have to be separated from each other by repeated distillations which are not carried out in such a way as to receive the exact and true chemical combinations, especially regarding the boiling points. However, the present market conditions are such that it is not necessary to produce chemically pure products. The largest part of all produced benzol and its homologues is sold separated in a rather crude manner. The characteristics of such marketable benzols will be explained later.

Production and Prices of Benzol

The amount of benzol recovered from the distillation of coals varies from 0.4 to 1.4 per cent by weight of dry coal; this is equal to 1.1 to 3.8 gallons per net ton. The present production of benzol in Germany exceeds. to a large extent, the united production of the other countries, as indicated in Fig. 3. The international prices for benzol, quoted in London, are given in Fig. 5.

The first uses of benzol and its homologues were as dissolving, cleaning or purifying agents. Solvent-naphtha is used especially in the manufacture of water-proof materials, for dissolving rubber and also as a substitute for turpentine. Xylol is used for dissolving naphthalene in gas works practice.

For many years the most important use of benzol was in the production of aniline dyes. In this industry it is

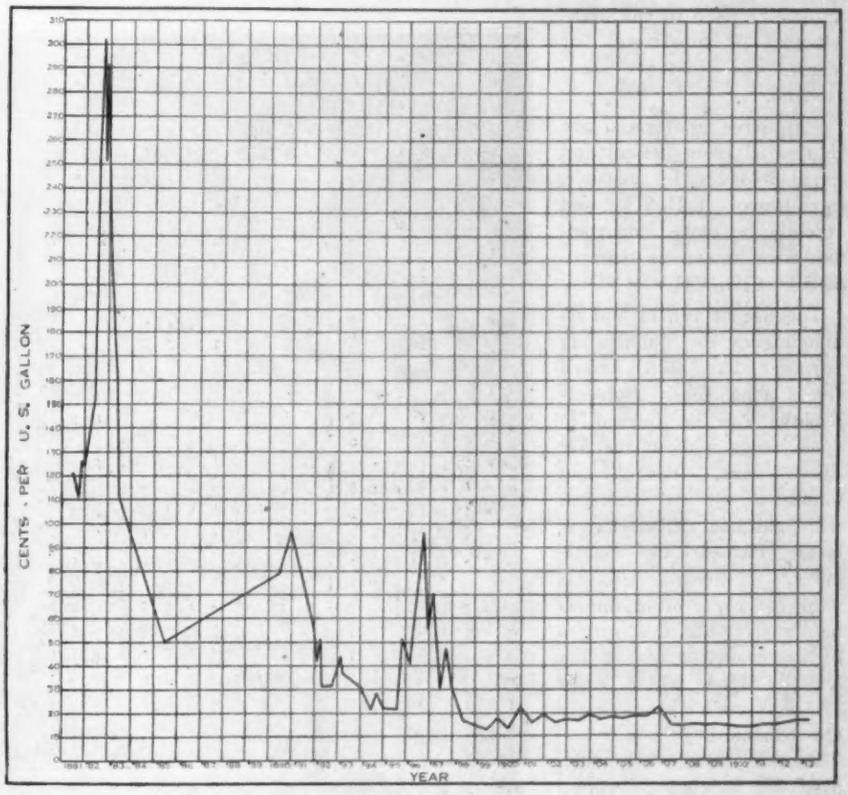


FIG. 5—CHART SHOWING PRICE OF BENZOL AT LONDON, ENGLAND, FROM 1881 TO 1913

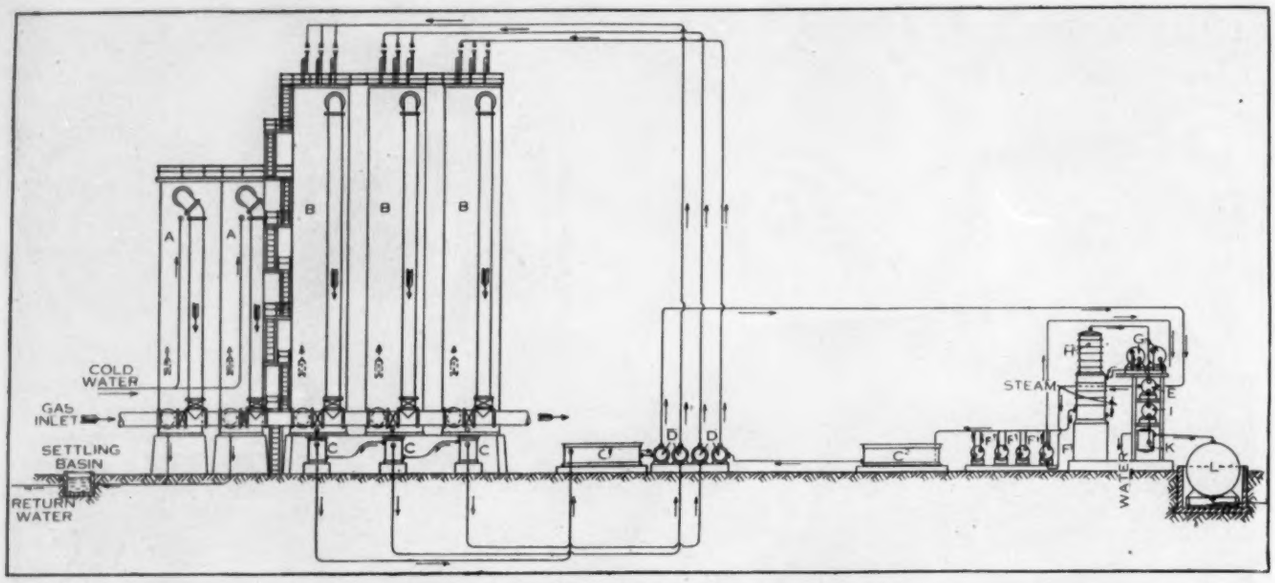


FIG. 6—SECTION OF A LIGHT OIL RECOVERY PLANT

first converted into nitro-benzol, $C_6H_5NO_2$, and then into aniline, $C_6H_5NH_2$. This aniline and its derivatives, is the raw material used in the manufacture of artificial organic paints and dyes. All homologues of benzol are used for the same purpose. Up to 1906, 75 per cent of the total amount of benzol produced in Germany was used in the aniline dyeing industry.

All benzols represent a basic material used in the manufacture of pharmaceutic substances, and artificial perfumes; benzol is also the original substance used in the manufacture of substitutes for sugar, for instance saccharine.

Explosive materials are fabricated from benzol and its homologues, for instance, nitro-benzol, $C_6H_5NO_2$, and recently a more important explosive known as trinitrotoluol, $C_6H_2(CH_3)(NO_2)_3$.

The use of benzol and its homologues for illuminating purposes has been known for a long time. Solvent-naphtha can be burned in open lamps without the use of a wick. Benzol and toluol mixed or unmixed with gasoline or spirits, is being burned in mantle burners. Benzol also is used for carburating illuminating gas, but this use is of importance chiefly in the United States where gases of a certain candlepower are demanded.

Recently benzol has been used for autogenic welding and cutting processes, also for lead burning. Used for these purposes, benzol is a cheap and effective substitute for hydrogen-gas and acetylene. Benzol also is used in the production of lampblack.

The most important of the modern utilizations of benzol is its use in motors, especially automobiles. In the first tests using benzol in automobiles, trouble was experienced. However, a mixture of purified benzol and toluol eliminates such difficulties as carbonizing and sooting the cylinders and spark plugs and the freezing of the fuel. Benzol is at least equal in quality to benzine and gasoline and is even more economical. The consumption of benzol for motor uses has developed during the last few years to such an extent that it now exceeds the amount of benzol used for the manufacture of aniline dyes. In 1910, 50 per cent of the total benzol production in Germany, equivalent to 10,000,000 gallons, was used as motor fuel.

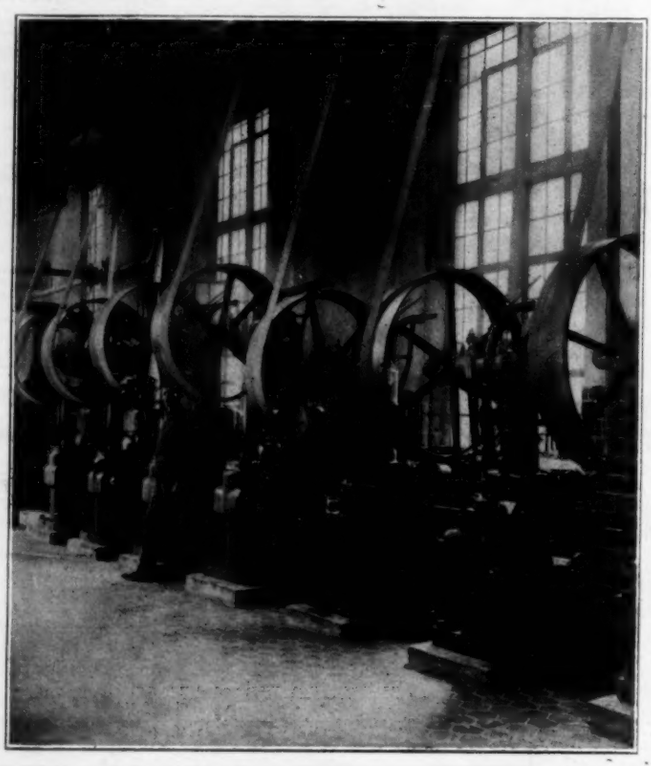


FIG. 7—WASH-OIL PUMPS FOR BENZOL RECOVERY AT THE UNSER FRITZ COLLIERY

Of the two sources of benzol, tar and gas, the latter is the most important, as about 95 per cent of the total benzol produced is contained in gas. In the following description the recovery of benzol from gas only shall be considered.

After 1859, Vogel proved that heavy hydro-carbons can be washed out by fat oils. The first patent for the industrial recovery of benzol was issued in England to Caro, Klemm and Engelhorn, of Germany. This patent at once established the basis for this industry, which up to the present time is recognized and is still in use.

In 1884 an English patent was granted to Carves for the recovery of benzol from gases, and he built his first plant in Terre Noire, France. He used washers filled with quartz pebbles through which the gas passed and met the tar oil flowing in the opposite direction. He distilled the enriched oil in two tanks which were

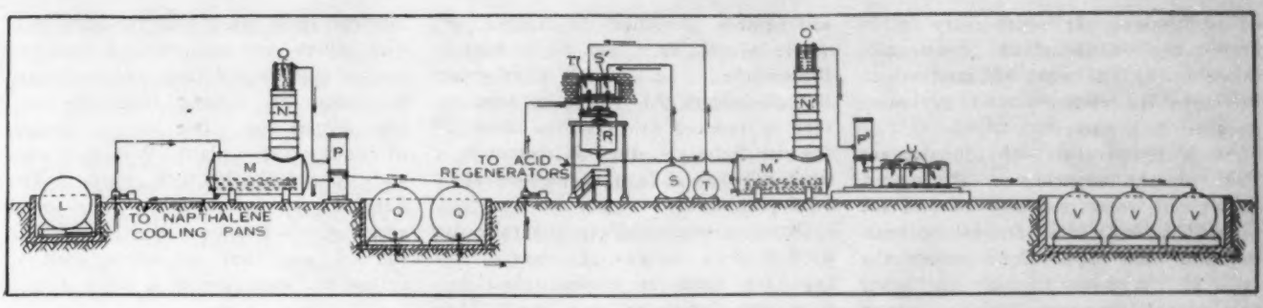


FIG. 8—SECTION OF A BENZOL RECTIFYING AND PURIFYING PLANT

heated by internal steam coils or by outside firing. The patent claims that the heavy tar oils employed in this operation can be used over and over again for a long time and can be distilled and purified from time to time.

In 1890, Franz Brunk built the first benzol recovery plant in Germany. This plant embodies the main features of the Carves plant. In 1894 Brunk left the periodical distillation of wash oil in still tanks and adopted continuous distillation in continuously working stills, while the heat of the hot debenzolized wash oil leaving the still was used to preheat the cold enriched oil. By this continuous distillation and circulation of the wash oil, Brunk finished the development of benzol plants.

In the following will be described a benzol recovery and rectifying plant, of the most recent type, built by the H. Koppers Co., Chicago. In Germany H. Koppers has built and has under construction benzol plants for 3,600 by-product coke ovens and rectifying and purifying installation for 2,100 ovens.

The benzol is recovered from gas after tar and ammonia have been separated from it. In plants where the ammonia water wash process is used, this gas has a temperature of 68 to 100 degrees Fahr., and where the direct acid wash process is used, from 103 to 170 degrees Fahr. In any case, the gas to be treated for benzol recovery should have a temperature of not more than 77 degrees Fahr. It is only at this temperature that the absorption of benzol from gas can be effected to a high degree.

For the purpose of reducing the temperature of the gas, it is passed through the coolers, *A*, Fig. 6, from which it passes over the benzol washers, *B*. In these washers, the gas is brought into contact with oils which at low temperature are capable of dissolving the benzol constituents. On the other hand, when the oils are reheated to about 266 degrees Fahr. with steam, they release the benzol constituents.

Tar oil of the following characteristics is used universally at European plants: Not more than 5 per cent shall distill below 390 degrees Fahr.; 90 per cent shall distill between 390 and 572 degrees Fahr.; the naphthalene content shall not exceed 7 per cent; the water content not more than 1 per cent, and it shall contain only traces of anthracene. In a few small plants in this country, good results are obtained by using straw oil for washing the coke oven gas. Two kinds of coke oven gas are produced. The benzol is removed from the gas used for heating purposes and is transferred to the surplus gas to increase its illuminating power.

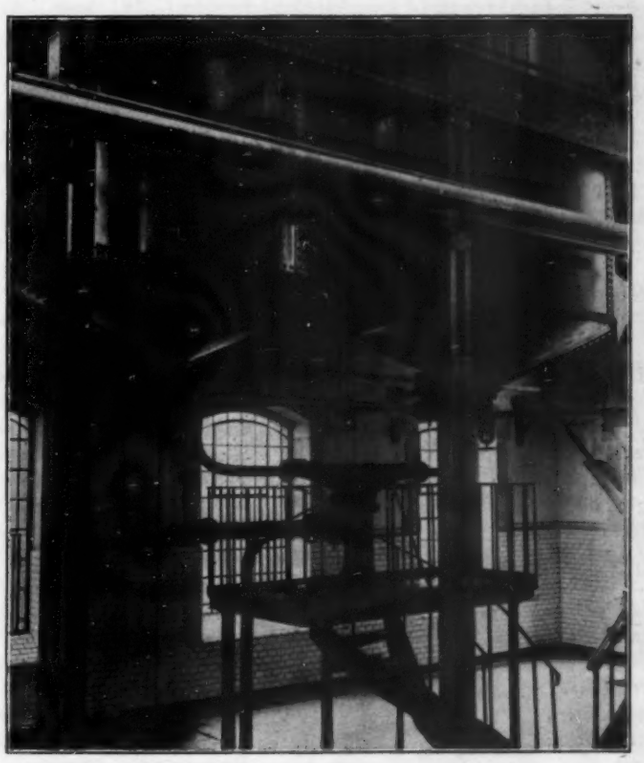


FIG. 9—ACID WASHERS AT THE RHEINPREUSSEN COLLIERY

The wash oil is discharged from the tanks, *C* and *C2*, Fig. 6, by pumps, and is pumped successively over the benzol washers, *B*, which contain wooden hurdles, and is led in the direction opposite to the flow of the gas. The wash oil, equally divided over the large surface of the hurdles, absorbs the benzol constituents up to within very small quantities, and finally this wash oil in a saturated condition is delivered to tank, *C1*, from which it is conducted to the benzol recovery plant to be heated for the purpose of releasing its benzol constituents.

To reduce the amount of steam required for heating the enriched oil, all heat used to distill the wash oil is delivered to the cold enriched oil on its way to the still. At first the enriched, cold wash oil is conducted to the heat exchanger, *E*, in which it is preheated to about 175 degrees Fahr. by benzol and steam vapors escaping from the still, *H*. From here it passes over a second heat exchanger, F, in which it is preheated up to a temperature of about 212 degrees Fahr.. by the hot debenzolized wash oil leaving the still, *H*. It is then heated to about 266 degrees Fahr. in one of the superheaters, *G*, by live steam.

The purpose of heating the wash oil to this temperature is to drive off all water and all naphthalene contained in it. The water is carried over in the oil from the gases which are wet owing to the fact that they have been cooled below their point of saturation. On the other hand, the oils are quite frequently cooler than the saturated gas in which case water is precipitated from the gas on cooling. The naphthalene is washed out of the gas by the wash oil in the same manner as the benzol and its homologues; 1,000 cubic feet of gas at a temperature of 80 degrees Fahr. contains 0.05 pounds

of naphthalene. It is necessary to liberate the naphthalene continually taken up by the wash oil, and which increases its viscosity and decreases its absorbing power.

At a temperature of 266 degrees Fahr. in the superheater, all benzol, toluol and water is driven off and the oil with its contents of xylol, solvent-naphtha and naphthalene enters the still, *H*. It flows through the lower part of this apparatus to the bottom, while steam is directly blown into the lowest part of the still and travels in a direction opposite to that of the oil. The steam drives off all xylol, solvent-naphtha and naphthalene from the wash oil. The mixture of benzol and water vapors pass through the upper half of the still, which acts as a separator of liquid, wash oil particles and performs a crude rectification of the vapors. The benzol and water vapors from the superheater also enter the upper part of the still and are rectified with the other vapors.

All vapors escape from the top of the still at a temperature of about 220 degrees Fahr., and enter the heat exchanger, *E*, where they are nearly all condensed and the preheating of the enriched wash oil is effected. The remaining vapors and the condensates formed in the heat exchanger then enter the water cooler, *I*, where the vapors are completely condensed and all condensates are cooled down to about atmospheric temperature. The condensates, water and light oil, enter the separator, *K*, where they are separated by gravity. The so-called light oil is a mixture of crude and impure benzol, toluol, xylol, solvent-naphtha, naphthalene and a part of the wash oil, and is collected in a collecting tank, *L*, where it remains for further fractionation and purification. The water is led to the waste liquor, or if it contains traces of ammonia, to the ammonia factory.

The wash oil, freed from the benzols and naphthalene, leaves the still at a temperature of about 257 degrees Fahr., and enters the heat exchanger, *F*., where it gives up a part of its heat to the enriched wash oil. It next enters the oil coolers, *F*1, where its temperature is reduced by water to about 77 degrees Fahr. It then is delivered to wash oil tank, *C*2, to be pumped again to the washers.

Direct contact coolers generally are used to cool the gas. Coolers of this type are used for cooling blast furnace gas, producer gas, etc. They consist of tall, cylindrical shells filled with wooden hurdles or steel trays. The gas enters at the bottom and flows in a direction opposite to that of the water entering the top. In the tubular coolers formerly used gas and water were separated by the walls of the steel tubes through which the water flowed. In this case it was not possible to cool the gas to a temperature as low as that in the direct contact coolers, the absorption of benzol having been dependent on the low temperature of the gas. On the other hand, the naphthalene deposits hindered the cooling of the gas by checking the transfer of heat through the tubes, while in the direct contact coolers the separated naphthalene is washed out by the water flushed through the cooler and occasional deposits do not affect its efficiency.

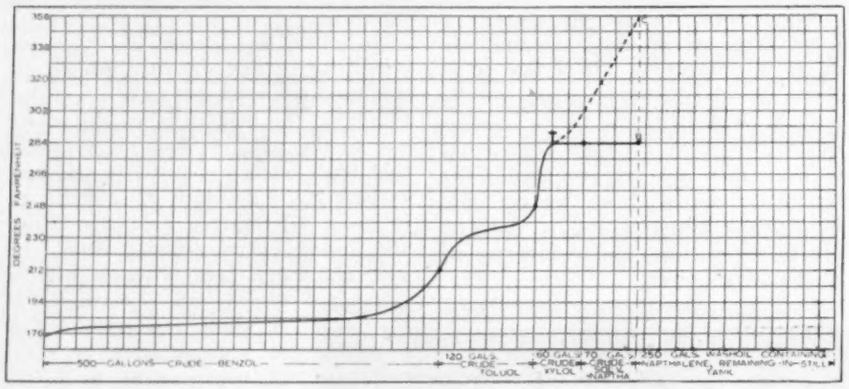


FIG. 10—PROPORTIONATE CONSTITUENTS OF LIGHT OIL, SHOWING THEIR BOILING POINTS

The naphthalene contained in the water leaving the coolers is easily separated in a manner similar to the method of cleaning of waste water leaving ammonia stills. The size of the naphthalene separators is, however, considerably smaller than the separator used in the ammonia plant. When water is scarce and is run over a cooling tower, a certain amount of naphthalene is deposited. Therefore, the hurdles are so arranged that they easily may be cleaned and the naphthalene collected.

In Germany and England, hurdle washers are generally used for washing the benzol from the gas. This type of washer consists of a tall, cylindrical shell filled with wooden hurdles which are so arranged that the gas is given a forward and backward movement in passing from the bottom to the top. The hurdles consist of small wooden planks 9/16 inch wide and spaced 11/16 inch apart. The hurdles are notched on the lower edge, which improves the dripping of the oil, and they are often built to follow the direction of a screw line.

In France, bell washers are commonly used, being constructed similar to ammonia stills. The oil flows from the top to the bottom over each tray, while the gas is blown from the bottom to the top through all compartments and is forced through the oil. It is apparent that the efficiency of these washers over hurdle washers of about equal sizes must be much greater, considering the thorough mixing effected. In hurdle washers, which for large plants range in heights from 80 to 90 feet, the oil may possibly flow down on the one side of the washer while the gas passes up the other. However, the bell washers have much higher losses of pressure and if they were of such a size as to have losses similar to those of hurdle washers, their cost would be much higher.

Steel is used in the construction of oil heating, distilling and cooling apparatus, with exception of the still, which is constructed of cast iron. There is no doubt that steel is a suitable material for all apparatus where the temperature of the wash oil is not high. Where, however, this temperature is higher than about 272 degrees Fahr., cast iron should be used on account of the corrosive effect of oil containing slight traces of ammonia. It is difficult to build apparatus with large heating or cooling surfaces and it is almost out of the question to construct them of cast iron without greatly increasing their cost. Oil super-heaters are subjected to the most severe conditions regarding corrosives. On account of this, spare heaters always are provided and so arranged as to be readily interchanged. The heaters are built of cylindrical shells filled with short standard boiler tubes which can be replaced easily and cheaply. Oil superheaters with spiral tubes can be used only in small plants because repairs necessitate entirely new and expensive coils. The other apparatus for heating and cooling the wash oil is so arranged that each individual unit can be taken out easily without disturbing the other apparatus.

The light oil collected in the storage tank, *L*, Fig. 8, is a crude mixture of benzol, toluol, xylol, solvent-naphtha and wash oil with naphthalene. The light oil is pumped to a still tank

with a capacity of 6,000 to 12,000 gallons for the purpose of fractionating it into its components. The reason for this large capacity is to obtain a more decided fractionation than would be possible with a smaller tank.

The light oil in the still is heated by two internal coils and one steam spray. The distillation of light oil begins at a temperature of about 176 degrees Fahr. when benzol is first distilled. The vapors pass through the rectifying column, *N*, and then through the dephlegmator, *O*. The construction of the rectifying column is similar to that used for ammonia spirit stills. The dephlegmator is a water-cooled tubular device, which cools the mixture of vapors, the heavier parts condensing and draining back through the rectifying column while the new, rising vapors evaporate the lighter parts of this condensate. From the dephlegmator the rectified vapors pass through the cooler, *P*, which is fitted with vertical, water-cooled tubes in the upper section and condenses the vapors and cools the condensates to about atmospheric temperature. The condensates then enter the lower section which acts as a separator to separate for benzols and water in such cases where direct steam is used for distillation. The different benzol products then drain from the cooler into separate storage tanks.

After benzol, toluol, xylol and solvent-naphtha have distilled off, the wash oil with its naphthalene contents remains in the still tank. The product received from 1,000 gallons of light oil vary, not only according to the kind of coal coked, but also to the operation of the light oil plant. However, they average about as follows:

500 gallons of crude benzol.
120 gallons of crude toluol.
60 gallons of crude xylol.
70 gallons of solvent-naphtha.
250 gallons of wash oil with naphthalene remain in the still.

The boiling points and the amounts of the products are given in Fig. 10. It shows that the boiling points are different from those of pure products on account of the fact that they are distilled from a mixture of different benzols, especially those near the points where one kind of benzol should finish and the next one begin.

The temperature up to which indirect steam for distilling can be used, depends upon the pressure of the available live steam. Generally, from temperatures of 280 degrees Fahr. upward, it is necessary to use direct steam together with indirect steam. In this case the distillation of solvent-naphtha and a part of xylol follows the curve, *T-B*, while by raising the temperature beyond 280 degrees Fahr. and without the use of indirect steam, the distillation would follow the curve, *T-C*.

The wash oil remaining in the still is drained into pans, where the wash oil is cooled by coming into contact with air, when the naphthalene crystallizes out. The wash oil is drained off and is returned to the oil separating tank, *C2*, Fig. 6, and again is circulated through the system. Just before the wash oil and naphthalene enter the pans, a small cooler is interposed to cool the wash oil to about 175 degrees Fahr., thus preventing obnoxious odors. In large plants, where the amount of naphthalene is great, a centrifugal dryer is employed for the purpose of separating the small amount of oil remaining in the naphthalene. The naphthalene so obtained can be sold as crude naphthalene or can be thrown into the tar.

The crude benzols in the storage tanks, *Q*, Fig. 8, have to be purified before they can be sold, and this is accomplished by washing them separately with sulphuric acid, caustic soda and water. The agitator, *N*, consisting of a large lead-lined vessel, is used to perform this work. It contains a centrifugal mixing device with which the washing is effected. The acid used has a specific gravity of 1.84. The amount required varies for benzol and toluol from 8 to 14 per cent by weight and for xylol or solvent-naphtha from 20 to 24 per cent. The acid is taken from the storage tank, *S*, and its quantity is measured accurately by the meter, *S1*. The mixer in the agitator is placed at such a height that the acid is raised from the bottom of the agitator and is discharged near the level of the benzol, being distributed so as to obtain a thorough mixture. This mixing is performed in about 30 minutes, then the agitator is shut down and 20 minutes is allowed for the used acid to settle to the bottom of the agitator. The acid affects the separation of the unsaturated hydro-carbons, chiefly phenoles and olefines. Most of these impurities form with the acid thick resinous compounds insoluble in benzol and which, on account of their high specific gravity, settle at the bottom of the agitator. However, a part of these resinous bodies, the polymere-olefines, dissolve in the benzol, giving it a brown color. On account of their high boiling points and resinous nature, they have to be separated from the benzol by re-distillation, thus causing the brown color of the benzol to disappear. The used acid at the bottom of the agitator is drained over a slight overflow into small tanks to be regenerated. The benzol then is washed with water to remove the remaining acid as far as possible. A solution of caustic soda is run into the agitator for the purpose of neutralizing traces of acid still remaining in the benzol. The caustic soda solution is prepared in the tank, *T*, and its amount is regulated by the meter, *T1*.

Similarly, this caustic soda is mixed with the benzol, allowed to settle out and is drained off. The benzol is then

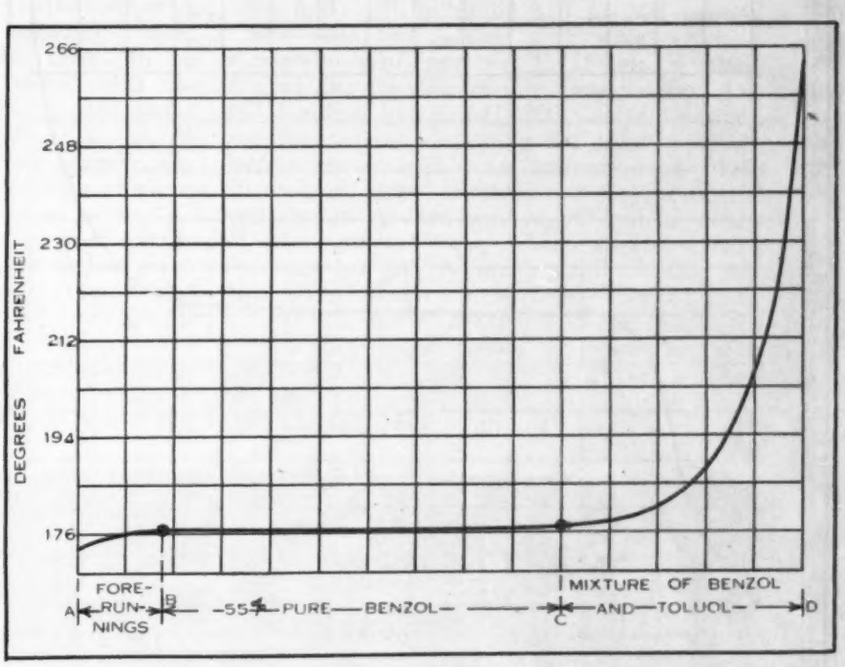


FIG. 11—CHART SHOWING BOILING POINTS AND RELATIVE AMOUNTS OF PURE BENZOL

washed again with pure water to remove all traces of caustic soda. During the washing process there is a loss of benzol caused chiefly by impurities in the benzol taken away by the soda. These losses amount to 5 to 7 per cent of benzol and toluol and 20 to 30 per cent of xylol and solvent-naphtha.

From the agitator, *R*, the washed benzol is delivered to the still tank, *M*1. If the plant is large it is desirable to use one or two storage tanks for washed benzols so that the agitator can work independently of the still tank. Still tank, *M*1, is constructed similarly to tank, *M*, used for crude distillation. It has heating coils, an especially high rectifying column, *N*1, and an effective dephlegmator, *O*1. Before beginning the second distillation of the benzol, it is necessary to consider what kind of finished benzol shall be produced. In this second distillation there is a possibility of improving the limits of the boiling point so that the finished product approaches the chemical characteristics of pure benzols. However, the largest demand for benzol at present is for products of inexact boiling points and in producing such material the purpose of the second distillation is simply to separate the benzol from the resinous olefines held in solution, no attention being paid to the boiling point. This distillation is accomplished very quickly and the rectifying column and dephlegmator are unnecessary and provision is made whereby the vapors pass directly into the cooler, *P*1. The benzols so produced are termed *purified benzols* and have the same characteristics in regard to boiling points as those of crude benzol, as shown in Fig. 10. The market in the United States for the next few years probably will require only the production of purified benzol and therefore, the rectifying column and dephlegmator can be dispensed with.

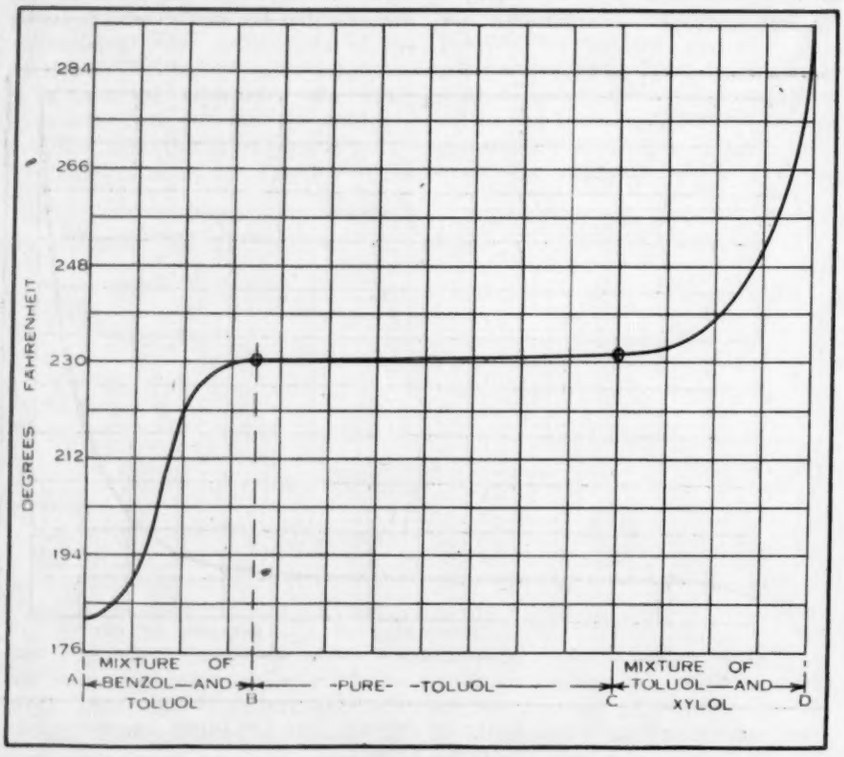


FIG. 12—BOILING POINTS AND RELATIVE AMOUNTS IN PRODUCING PURE TOLUOL

Profits

The profits of benzol plants in Europe are high and have ranged from 50 to 100 per cent during the last few years. In this country, however, the profits will be slightly less. The following calculation, as an average, will be based on 2,000 net tons of dry coal per day and two gallons of benzol and homologues recovered from the gas from one net ton of coal. The products recovered, per annum, then will be as follows:

Per cent.	Gallons.
Benzol 67	978,000
Toluol 16	234,000
Xylol 8	117,000
Solv.-naph 9	131,000
Total gallons	1,460,000
1,460,000 gals. at 15c	$ 219,000
Crude naphthalene, 330 net tons, at $5	1,650
Regenerated acid, 360 net tons at $6	2,160
	$ 222,810

Expenses Per Year.

Raw materials, such as wash-oil, sulphuric acid and caustic soda	$15,000
Steam for the different distillations, air compressor, loading pumps, acid regeneration and cooling water	15,000
Electric power for water pumps, oil pumps, agitator and illumination	6,200
Wages for three distillers and two helpers	5,000
Overhead expenses, fire insurance, maintenance and depreciation, assuming the cost of the complete plant to be about $300,000	30,000
Calorific loss of the gases	13,000
	$84,200

Profit yield: $222,810 — $84,200 = $138,610, 46 per cent interest on the capital invested.

Cost to produce 1 gallon, $84,200 ÷ 1,460,000 = 5.8 cents.

The profits shown in this statement are dependent largely on the price of benzols. In the United States benzols will, without question, be used chiefly for automobiles and other internal combustion motors. Therefore, benzol will be a competitor of gasoline. Today the supply of gasoline is becoming constantly more limited and the demand is steadily increasing. Therefore, the price of gasoline is advancing constantly.

In such cases where the market demands benzol of more rigid requirements, a second careful fractionation is accomplished in the still tank, *M*1, Fig. 8, and benzols are produced with characteristics similar to those of pure products. In this case, the high rectifying column and the dephlegmator is used. The vapors pass through the rectifying column, *N*1, and dephlegmator, *O*1, entering the cooler, *P*1, where they are condensed and the condensates cooled to about atmospheric temperature. The condensates drain into small receivers, *U*, where the quality can be tested before the products are conducted to the storage tanks, *V*.

The distillation of benzol of rigid requirements takes about five times as long as the distillation of crude benzol. The still tank, for instance, is filled with 10,000 gallons of washed benzol, of boiling points as shown in Fig. 10, and the distillation as accomplished is indicated in Fig. 11. The parts from *A* to *B* are forerunnings consisting of some few per cent of impurities, for instance, carbon-bisulphide. The part from *B* to *C* is pure benzol, while the remaining part from *C* to *D* is a mixture of benzol and toluol, the temperature curve of which follows the indicated line from *C* to *D*. The amount of pure benzol recovered from the washed, crude benzol

(*Continued on page* 653.)

THE ABC OF IRON AND STEEL

Wire and Wire Rods—II

By Kenneth B Lewis

Wire drawing is the art of reducing the section of a metal bar by drawing it through a tapering hole, whereby the metal is compressed and elongated. The purpose of wire drawing may be to produce a smoothly-finished product of more accurate size than can be rolled, or to develop in the metal some desired physical characteristics due to cold working, or the reduction of metal to a size or shape which cannot be obtained economically by other means, or some combination of these purposes.

Wire drawing requires much more power than hot rolling, hence it follows that a given size of wire shall be produced from a rod rolled as close to finished size as rod mill practice and the requirements of the product will permit. Long experience has resulted in the establishment of a point beyond which it is, in general, more expedient to draw than to roll, and in steel this point (about 0.207 inch or 5¼ millimeters) is the familiar No. 5 rod.

Hot rolled rods of No. 5 gage arrive at the wire mill in bundles of 150 to 300 pounds. These rods are covered with scale which is extremely hard, and would, if left in place, destroy the die hole almost immediately. The rod bundles, in lots of 1,000 to 2,000 pounds, are lowered into a boiling hot solution of dilute sulphuric acid. An immersion of 10 to 20 minutes partly dissolves and loosens up the scale, which is then washed off with a stream of water from a hose. After careful rinsing the rods are dipped into a vat of boiling hot lime water mixed to the consistency of milk, of which a thin coat adheres to the rods. This lime coating is of service in connection with the lubricating of the wire as it goes through the die. The rods then are lowered onto trucks and wheeled away to the dry house.

FIG. 12—GENERAL VIEW OF A WIRE BENCH

The dry-house, or baker, is a brick chamber heated to about 300 or 400 degrees Fahr., in which the rods are baked for several hours. From the baker the rods go to the wire benches. Each bundle is thrown upon a freely-running reel, from which the wire uncoils as it runs through the die. Each rod must be pointed in order that it may be started through a die hole smaller than its own diameter. This pointing is generally effected by some form of small cold rolling mill operated by hand or power and located on the bench beside the wire drawing block, or in some other convenient place. A point about 3 inches long is produced, slightly smaller in diameter than the die hole. The point is pushed into the hole and may be seized at the other side of the die by tongs which have a mechanical back and forth motion. In this way sufficient length of wire is pulled through the die to permit its end to be attached to the edge of the revolvable wire drawing block. The clutch is then thrown in and the block starts revolving, winding the wire smoothly on its surface as it is drawn through the die. When the entire rod bundle has passed through the die the block is stopped and the wire lifted from it in a compact bundle. The wire may be tied

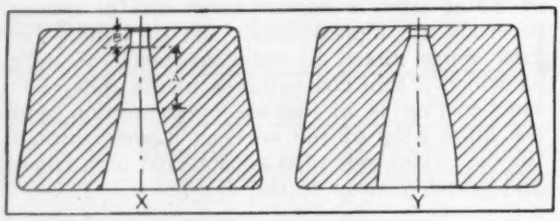


FIG. 13—SECTIONS THROUGH STEEL AND COPPER WIRE DRAWING DIES

and sold in this condition, or, if intended for a smaller size, it may be again thrown on the reel, pointed and drawn through a smaller hole, the process being repeated until the desired size is reached.

This is, in outline, the process of wire drawing; its various steps, however, require a more extended comment. The cleaning process is a much more important one than might be supposed. If the rods are insufficiently cleaned or imperfectly coated with lime, the die hole is subjected to excessive wear and the resulting wire will be scratched, out of round, or of increasing gage from the first to the last end. Such troubles may make themselves known during the first draft or during any following draft. If, on the other hand, the rods are overcleaned the result is brittleness. This brittleness may cause the breaking of the wire in the die in any one of the drafts, or it may remain latent and develop unexpectedly in the wire several days, or even weeks, after it has been sold, and possibly made up into wire products. The brittleness is accompanied by a surface hardness which is trying to the dies. *Acid brittleness* is guarded against by long and careful baking of the lime-coated rods in the dry house. Insufficient baking may result in brittleness, and, conversely, long baking will generally restore to health overcleaned rods unless their treatment has been absolutely brutal. This condition is generally believed among the wire workers to be due to acid actually imprisoned between the molecules of steel and they are accustomed to speak of *baking out the acid* as though there were an actual emission of acid fumes from the rods. The condition has been the subject of study in several of the experimental laboratories connected with the larger wire mills and it has been established that the rod does, during cleaning, absorb not acid, but hydrogen, by a process called *occlusion* and that this hydrogen is the cause of brittleness; furthermore, it has been ascertained that the hydrogen can be expelled and the rod restored to its proper condition by long heating at the prevailing dry house temperatures.

We have spoken of the lubricating value of lime coating, and will deal with it in more detail later. Another lubricant is sometimes applied during the cleaning process. This is the rust coat, or *sull*. If, after their removal from the acid, the rods are played upon by a gentle spray of water, there develops upon the surface of the steel a soft, slimy film of iron oxide, which, after being covered by the ordinary lime coat and baked, is an excellent aid to lubrication. A good rust coat permits rods to be given heavier drafts and to be drawn more drafts before being annealed. The rust coat is much used, particularly on high carbon wire. It unfortunately leaves the drawn wire dark in color and is, therefore, used only in cases where the wire is to be subsequently annealed, or coated, or made up into nails or other articles which may be cleaned by tumbling. It is an interesting paradox that iron oxide in the form of either mill scale or ordinary red rust is fatal to the drawing process, while in the form of the rust coat it is a valued aid to lubrication.

Wire drawing dies may be divided into two classes, the chilled cast iron die and the steel plate. Though both are extensively used in this country, the chilled iron die is a favorite, the steel plate being more common in Europe. A section of a die through one of its holes is shown at *X*, Fig. 13. The larger, tapering portion serves as a chamber into which the rod carries loose lubricating material, which is caught between the rod and the tapering sides, and carried into the working part of the die. The gentler taper at *A* is the working part of the die where the compression and flow of metal takes place. The short, straight neck of the hole, *B*, is merely the allowance made for wear, and gradually becomes shorter as the die is worn, until the taper reaches all

the way to the outer edge. The die then is sent back to be redressed. It would appear that a long-necked die hole would be a long-lived one, but there is a limit to the practicable length of the neck, varying with the tensile strength of the wire. The passage through this section of the die is a severe strain on the wire. Dies for high carbon wire, therefore, are made with a long bearing, sections *B* and *A* being comparatively long, while copper, at the other end of the scale of tensile strength, requires such a die as illustrated at *Y*, Fig. 13.

Chilled iron dies, which are extremely hard, are prepared by reaming out their cast holes, and as the holes wear they may be redressed by reaming to a larger size, until at last they become too large for the strength of the die.

Steel dies are made of the best grade of tool steel. When their holes are worn out they are upset to a smaller size by gently hammering around the hole and then reamed out by hand to their original sizes. The cold working performed in upsetting hardens the metal and from time to time the steel die is carefully annealed to restore its malleability.

Wire drawing consists in pulling wire through such a die as has just been described. For the sake of convenience in handling long pieces it has been the practice for several centuries to do the drawing with an appliance which will simultaneously draw and coil the product. Such an appliance is shown in outline in Fig. 14. Having thrown the rod bundle upon a reel and prepared a tapering point, the operator enters this point through the die. The die is clamped into a metal box which is filled with lubricating material, generally either powdered soap or grease. As the rod passes through the die box lubricating material is carried into the tapering hole and through the die, forming a thin film between the wire and the die. A direct contact of metal to metal without an intervening film of lubricating material would result in rapid wearing of the die and injury to the wire. The value of the lime coat here becomes manifest, although it is not known whether its function is to combine with the soap, or grease, and increase its lubricating value, or, by its rough surface to aid in gathering lubricating material and carrying it so far into the die hole that it is caught and carried through.

By means of tongs actuated by some such device as is shown in Fig. 14, sufficient wire is pulled through to permit the end to be attached to the top edge of the drum, or block. The block then is lowered slightly by means of the foot treadle so that jaws on its lower surface are engaged by jaws attached to the constantly revolving vertical spindle, and the drawing operation starts. The block being slightly tapered, the wire at once winds down to the flange, after which it continues to come onto the block at this point, forcing up out of the way the strands already in place. The strands forced upward on the tapering block soon become slack as they get onto the smaller diameter and at the end of the draft the bulk of the wire is bunched on the upper edge of the block, or on extension pins rising above the edge, ready to be lifted off and tied. A wire bench consists of a number of these block units mounted on a common frame, their spindles all driven by bevel gears from the same main shaft.

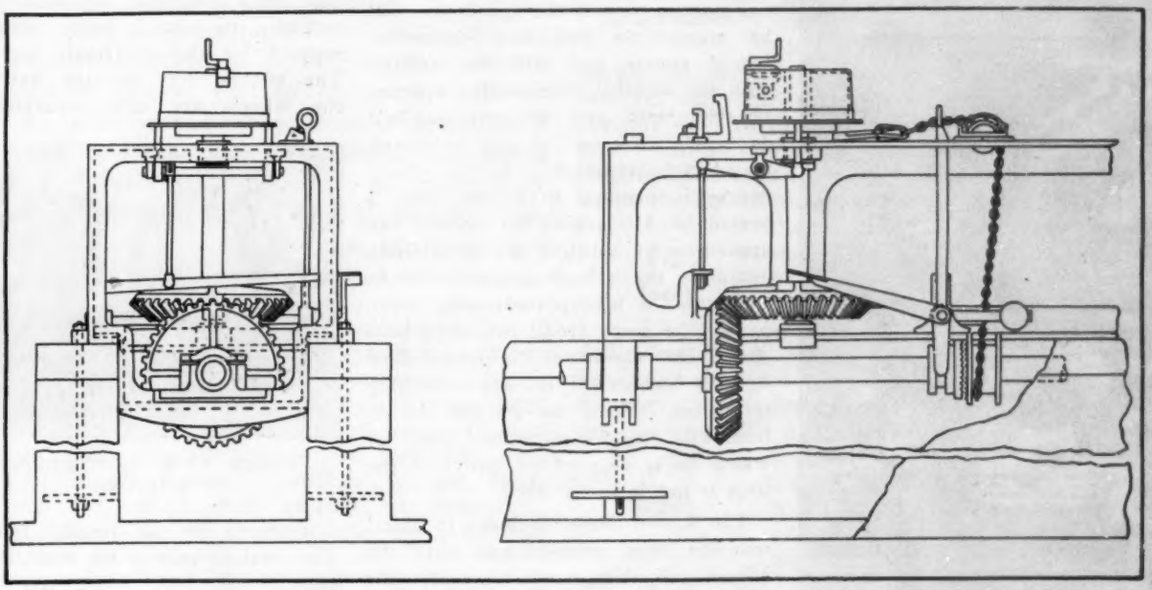


FIG. 14—END ELEVATION AND SECTION OF A WIRE DRAWING BENCH

A Difficult Drop Forging

Few industries have shown greater development in the past few years than the manufacture of drop forgings. This has been due largely to the demands of the automobile and gas tractor manufacturers for forgings of increasing weight and intricacy. An idea of the present-day possibilities of the drop forging business may be obtained from the accompanying illustration, which shows a six-throw crankshaft for a heavy gasoline engine recently made by the Ingalls-Shepard Forging Co., Harvey, Ill.

This shaft was hammered from

HEAVY CRANKSHAFT, DROP FORGING

the bloom under one set of dies. In making most forgings of similar size, two pairs of dies are used. One set is employed for roughing and the other for finishing, the piece being reheated between operations. At the Ingalls-Shepard plant, both breaking-down and finishing operations are performed under the same dies.

The crankshaft is 9 feet 6 inches long, with a minimum diameter at the bearings of 3⅛ inches. It is for an engine having an 8-inch stroke. The forging when finished weighs over 400 pounds. The flange, shown at the upper end of the shaft in the illustration, is 9 inches in diameter and 1½ inches thick. In making the shaft, it was first forged to the proper size and then twisted while hot.

Industrial School for Apprentices

The Woods Engineering Co., Alliance, O., manufacturer of power-driven saws, grinders, etc., has established an industrial school for apprentices which embodies features of considerable interest. Applicants for apprenticeship are required to be 16 years of age and to have sufficient education for entrance to a first-class high school. The term covers four years, divided into eight periods of 1,350 hours each.

The apprentices are taken on six months' trial. If, at the end of this period, it is agreeable to both apprentice and employer, the apprentice will be started in the shop industrial school course and will be credited with six months' time on the apprenticeship term and allowed one-half day each week on full pay to attend the shop industrial school. The school course is planned to extend over a period of 3½ years, but should the apprentice by aptitude and extra study complete the school course prior to the close of his apprenticeship term, he will be given credit for full school time. This eliminates the school time for the balance of his apprenticeship term, but he will be allowed double time with pay for all school time for which he is so credited, provided the time is put in in the shop.

The school course includes technical machine shop practice and both the school and shop work are under the supervision of an experienced instructor. There is no charge made to the apprentice for text books, stationery or anything connected with the school, but he is required to provide himself with a chest and set of tools, such as are ordinarily possessed by a first-class machinist.

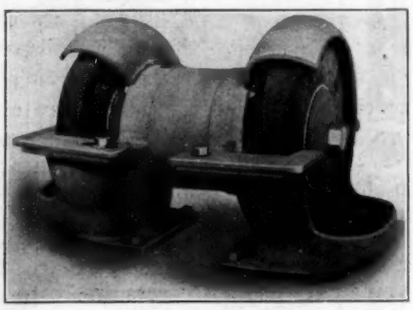
In respect to the shop work, apprentices have the same privileges, such as overtime, premiums, bonuses or any other special systems of remuneration or benefit as the regular machinists and each is entitled to a vacation of one week in each year without pay.

To impress upon the apprentice the value of saving, the company has further arranged to open a savings account with interest in the name of the apprentice, depositing to his credit $2 each month of his apprenticeship time in some good savings bank. No part of the bonus, however, will be given to the apprentice until he has satisfactorily completed his four years apprenticeship. On completion of the shop school course and full apprenticeship term, the apprentice will receive the full amount of the savings account then to his credit, together with a diploma signed by an officer of the company.

This system has been installed after careful investigation and study of apprenticeship courses, continuation schools, etc., and its outcome will be watched with considerable interest by other concerns in the metal trades.

Motor-Driven Grinder

In the accompanying illustration is shown a 12-inch motor-driven grinder, built by Forbes & Myers, Worcester, Mass. The motor is of the squirrel cage induction type, the frame being extended to form a water basin and support for the adjustable tool rest. The guards over the top halves of the wheels are cast separately so



BENCH TYPE MOTOR-DRIVEN GRINDER

that they can be readily removed. The rotating part of the machine consists of cast iron, being cast onto a rolled steel shaft, the grinding wheels being mounted on the ends of the shaft. Ball bearings are used throughout, being protected from dust and grit by covers which fit tightly around the shaft. The machine has a capacity for wheels 12 inches in diameter with 2-inch face, and the grinder can be furnished either for use on a bench or mounted on a stand.

The production of gold in Colorado in 1912 showed a decrease in value of $413,413; of silver, an increase of 881,902 ounces; of copper, a decrease of 917,185 pounds; of lead, an increase of 5,562,978 pounds; and of zinc (figured as spelter and zinc in zinc oxide) an increase of 37,615,356 pounds. With increased market prices there were increases in value of $169,644 for copper, $1,165,434 for silver, $250,334 for lead, and $3,730,749 for zinc.

IRON AND STEEL MARKETS

Markets Await Developments on the Tariff

But Show No Signs of Demoralization—Possibility of Importing Foreign Products Uncertain—Decline in Pig Iron Output Checked

BY GEORGE SMART

Interest naturally centers in the probable effects of the low tariff law on the iron and steel trade. In eastern territory particularly, much attention has been given to the subject during the past few days. As to pig iron, at present it is not probable that any of the English product could be brought to the United States, although the decline within a day or two has brought the English price for delivery in this country closer than it had been to prices made by northern and southern furnaces for delivery on the Atlantic coast. As to billets and other forms of semi-finished steel, which are now duty-free, careful figuring is being done to see whether it will pay to import them. But so many considerations, such as freight rates, which vary greatly from time to time, credit systems, which are not always satisfactory to American dealers, and the quality, which frequently does not come up to American demands, must be considered that it is extremely difficult to make any predictions as to what importations, if any, will be profitable. There is even more uncertainty as to finished products, which, however, are less likely to be imported than the crude steel. On the whole, the iron and steel manufacturers are viewing conditions without much alarm and are complacently awaiting developments. The result is, however, that the waiting game has brought sales to a minimum.

Pig Iron Production

The decline in pig iron production, which has continued steadily since last April, was checked in September, when the daily average output of coke and anthracite pig iron was 83,137 tons, a gain of 1,298 tons over August. As September had only 30 days, the production for the month was less. The average daily production for the steel works furnaces made a gain of 1,061 tons, while the merchant stacks gained only one ton. There was a net loss of only two in the number of active furnaces on the last day of September, compared with the last day of August.

Crude Steel

Reports of lower prices on billets and sheet bars are persistent. It is understood that some important transactions have taken place. In connection with the possibility of semi-finished material being imported from England and Germany, the recent inquiry for 3,000 tons of steel skelp for Glasgow is interesting. It is understood that $30 per ton, delivered, was quoted by an American company, but that the business went for $26.80 to a German company. The United Sons of Vulcan, who have been endeavoring to obtain an agreement to a flat $7-a-ton rate for puddling, are now considering a sliding scale wage similar to that of the Amalgamated association, and it is probable that the muck bar mills will resume soon on a sliding scale basis.

Shapes and Plates

Weakness continues in the plate market and the 1.35c price, which has been noted for several weeks, is becoming more general. An eastern plant is also making 1.35c, Pittsburgh, on structural shapes, but other plants have not yet met this quotation. There is only a fair amount of structural contracting and competition is keen. In the west, 7,500 tons have been taken, including 2,700 tons for the Crane Co. buildings, awarded to the American Bridge Co.

Pig Iron

Nearly all the pig iron consumers being covered for the remainder of this year and anxious to await developments before contracting for delivery after Jan. 1, the market is extremely dull. In Chicago, 4,000 tons of charcoal and malleable iron have been bought by a Racine foundry. In the south, quotations are being well maintained, but there is very little new business.

Scrap

The government is preparing to sell a large amount of old material, which it has accumulated in the Isthmus of Panama. Scrap prices in some centers are now lower than they have been in ten years, particularly in the Chicago district, where there is speculation as to what would happen if business should become as stagnant as it was in 1907.

Iron and Steel Bars

Bar iron is being sold at some eastern plants and by some makers in Indiana at 1.25c at the mills, and it is supplanting steel, which is firmly held at 1.40c. There is, however, no great amount of buying of steel bars at the present time, demand being chiefly for reinforcing bars.

Railroad Buying

The Burlington has closed for 25,000 tons of steel rails for next year's delivery with the Illinois Steel Co., which has also taken 20,000 tons from the Great Northern. The Lackawanna and the Bethlehem Steel companies have received 5,000 tons each for this year's delivery from the Great Northern. The Central of New Jersey has placed 6,000 tons of rails for this year's delivery with the Pennsylvania Steel Co. Pending work includes 6,500 tons for the Seventh avenue subway, New York, on which the Thomas J. Buckley Engineering Co. is the low bidder.

Pittsburgh is Awaiting Developments

Following the Passage of the Tariff Bill—Market is Quiet With Considerable Price Irregularity

BY C. F. WILLIAMS

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg.,
Pittsburgh, Oct. 7.

With the gates to this country practically thrown open last week to foreign industrial interests, through the signing of the new tariff law, American manufacturers probably will confront much keener competition, especially along the seaboard, than they have experienced in the past, but the general iron and steel trade continues to regard the situation, both present and future, with a decided view of optimism. Expressions frequently are heard that lower duties on iron and steel products were discounted several months ago, and as soon as the trade passes through the period of re-adjustment, believed to be well under way at the present time, it is hoped satisfactory market conditions again will prevail.

The general market continues quiet, with both producers and consumers anxiously awaiting developments. Continued irregularity features some departments, but, in the main, prices of the finished lines have yielded exceedingly little from the high levels of three months ago. Semi-finished steel products are weaker, the wire market is uncertain, but other materials, although quiet, appear to be holding their own.

Pig Iron.—With the exception of some trading, the market is featureless. The Republic Iron & Steel Co., which has blown out its Hall furnace, has traded sheet bars for 5,000 tons of basic and 5,000 tons of Bessemer with the Brier Hill Steel Co. The Allegheny Steel Co. has obtained between 500 and 1,000 tons of basic through sheet bar exchanges. The Standard Sanitary Mfg. Co. probably will not buy its fourth quarter foundry iron for at least a week. Prices are unchanged.

Ferro-Alloys.—The removal of the $2.50 a ton duty on ferro-manganese already has benefited consumers in this district, but the lower price of this material has failed to stimulate buying, and the market continues quiet. Other alloys also are quiet.

Plates and Shapes.—There is no change in the market. Despite efforts of mills to maintain 1.40c and 1.45c, some tonnage is selling at 1.35c. Demand is light, and several mills are in need of additional tonnage.

Sheets. — Sheets have managed to hold their own this week, and prices are no weaker. Manufacturers are refusing to sell beyond the end of the year at prevailing quotations. Larger mills are being operated at about the rate prevailing last week, but some of the smaller plants are slowing down.

Rails and Track Material.—Contracting for next year's requirements has not yet begun in this district, although most of the railroads have opened negotiations. Spikes are being held at 1.65c and other track fastenings are firm.

Billets and Sheet Bars.—Reports of lower prices will not down, and the market continues uncertain. Some of the larger makers are not attempting to offer material, although practically all of them have accumulated surplus tonnages. Sales of billets at less than $23, mill, are reported, but manufacturers do not regard the market below that figure.

Hoops and Bands.—Both hoops and bands continue firm, and are in fairly good demand. The market is stronger today than a month ago. Specifications have not fallen off and deliveries continue deferred.

Iron and Steel Bars.—Iron bars have declined $1 a ton within the last 10 days, but are as strong as they were a year ago at this time. Demand is light, and consumers are not interested in the future. Steel bars have been well pegged at 1.40c for 12 months, and are regarded the strongest item on the list. Shafting is being held at 62 per cent off, but again is showing irregularity.

Muck Bar.—With mills planning to operate on the open shop plan, and with members of the United Sons of Vulcan considering a sliding scale wage instead of the proposed $7 a ton rate, it is probable mills will resume operations shortly. The last sale of muck bar was on the basis of $31, Pittsburgh, but sales in the east have indicated a gradual decline the last five or six weeks.

Nuts, Bolts and Rivets.—Rivets have been selling at $2 a ton under the nominal market and are now quoted at 1.90c and 2c as a minimum for structural and boiler rivets, respectively. Nuts and bolts continue somewhat irregular. Deliveries are deferred.

Tubular Goods.—It is impossible to absolutely confirm reports that steel pipe discounts would be reduced shortly, but it is understood some makers have guaranteed prices until Nov. 15. Although there has been no general change in merchant boiler tube prices, lower quotations have been offered on certain sizes the last few days. Discounts on tubular goods are not so regular as a month ago.

Tin Plate.—Buying for next year has not yet begun, and prevailing prices are considered nominal. Some of the mills are in need of additional tonnage, but the more prominent manufacturers will be kept busy until buying for 1914 begins.

Wire.—Reports of concessions are heard, although leading manufacturers in this district are holding prices firmly, on the basis of 1.65c for nails, and tonnage continues to be sold at that figure. Within the next three or four days, it is probable greater insight into the situation will be enjoyed, and in the meantime we quote as previously.

Coke.—The market is quiet. Consumers are refusing to pay $2.50, ovens, for either prompt or forward fuel, and the market is not considered above $2.25, either delivery, although some shippers of strictly standard coke continue to ask $2.50. Foundry coke is selling at a range from $2.85 to $3.10, ovens, for either prompt or future shipment, with some dealers refusing to sell at less than $3.25. The Connellsville Courier, for the week ending Sept. 27, says production was 385,494 tons, an increase of about 7,000 tons over the week before.

Old Material.—Dealers are finding difficulty in disposing of material at profitable prices, and many of them are discouraged over prospects. Heavy melting steel is being held at $12.50, but several grades have registered additional declines this week. Consumers continue to obtain the bulk of their material direct from railroads.

The Massillon Foundry & Machine Co., Massillon, O., advises its recent increase of capital from $100,000 to $200,000 is to allow financing of its present business. It is proposed to build a new plant, but this is far in the future and has not been taken up definitely.

The Vulcan Detinning Co. lost $162,666 during the six months ended June 30, according to the statement just issued. The company's sales amounted to $319,420, total income $343,577, and total expenses $475,619.

More Railroad Buying at Chicago

But the Market in General is Quiet—Round Tonnage of Pig Iron Bought for Next Year's Delivery

BY H. COLE ESTEP

Office of THE IRON TRADE REVIEW,
1521-23 Lytton Bldg.,
Chicago, Oct. 7.

In the west at least, the expected trade winds have so far failed to materialize and October finds the iron and steel business becalmed. The most encouraging development of the week under review is an appreciable increase in railroad buying, including fair orders for bridge material, rails and passenger cars. But it yet remains to be seen whether this is simply one of the occasional spurts, which occur in any dull season. Prices of plates and shapes are showing indications of wavering, but it is doubtful if any transactions have yet been concluded in the west on a basis of 1.35c, Pittsburgh. Orders for wire and merchant pipe are very encouraging. Scrap prices are approaching new low levels.

Pig Iron.—About 4,000 tons of charcoal and malleable Bessemer iron have been purchased by a Racine foundry for shipment over the first half of 1914. This is the first larger order reported in this territory for next year's delivery. The prices are understood to be close to $15, f. o. b. furnace, for the coke iron, and $15.25, delivered, for the charcoal. There is also some fair inquiry for southern iron and northern foundry grades. A Milwaukee stove manufacturer is in the market for 1,000 tons of foundry iron for first half delivery. Sales of foundry iron for shipment during the remainder of this year are fairly good and the furnaces are able to keep their stocks at a minimum. It is expected that the Thomas furnace at Milwaukee will blow in again in the near future.

Merchant Bars.—The price of steel bars remains unusually firm and there are no reports of quotations less than 1.58c, Chicago. Two explanations are advanced for the strength of the bar market in the face of general softness. It is pointed out that the implement makers are covered for the next year and are, therefore, not anxious to disturb steel prices and thus bring about a clamor for lower quotations on finished agricultural machinery; also the steel makers have a large tonnage of bar orders still on their books which encourages them to take a firm price attitude. Competition is being keenly felt by the manufacturers of hard steel bar products, due largely to low quotations on wrought iron. Rerolled steel has been offered recently at 1.45c, Chicago, this being a cut of $1 a ton under market quotations. Bar iron remains weak and mill operations are becoming less active. The iron mill output in this territory is now about 65 per cent of capacity. Although in general no prices lower than 1.30c, Chicago, are being quoted, attractive business will bring out even better figures. This is indicated by the purchase of a round tonnage of iron bars by a local bolt and nut maker at 1.25c, Chicago.

Plates and Structurals.—The question now uppermost in the trade is whether or not the current price of 1.40c, Pittsburgh, would hold against attractive offers of business at a lower figure. There is considerable miscellaneous demand for both plates and shapes and fabricating contracts show some improvement. The car companies are specifying for work that they have in hand, but at the present time there is no new car business of consequence in sight. This condition naturally results in a heavy tone.

Rails and Track Fastenings.—The conviction seems to be growing that October will witness heavy rail orders for next year's shipment. The western mills are in a position to offer early rolling dates. It is now understood that the Burlington system has practically concluded its negotiations involving 35,000 tons of standard open-hearth rails for early 1914 delivery. This order was accompanied by a liberal contract for track fastenings. A large share of it will be taken by the Illinois Steel Co. There is a fair run of rail business for immediate delivery.

Bolts, Nuts and Rivets.—In the present period of declining prices, rivets were among the first items to show decided weakness. There is no evidence now of any change in this condition of affairs at an early date. Structural rivets are being quoted at 1.95c, Chicago. The demand for bolts and nuts is also limited.

Sheets.—In the west at least, the downward trend of sheet prices seems to have been arrested for the time being with mill quotations on a basis of 2.05c to 2.10c, Pittsburgh, for No. 28 black and 3.10c for the same gage of galvanized sheets. Bookings are fairly heavy and mills are operating practically at their capacity. New store prices on No. 28 black sheets have been fixed at 2.75c, Chicago. Other quotations on sheets out of stock are unchanged, but it is reported on good authority that some jobbers are forced to make very attractive offers in order to compete successfully with the low prices and quick shipments now possible from the mills.

Wire Products.—Throughout all of the territory north of the Missouri river and west of the Mississippi, crop conditions are unusually good. Western wire makers are now experiencing what they feel confident is the first wave of a flood of orders for agricultural wire and fencing from the northwest. Prices appear to be well grounded at 1.45c, Pittsburgh, for plain wire and 1.65c for wire nails. Rumors that fence makers and other large buyers have been able to obtain plain wire at 1.32½c cannot be confirmed in this territory.

Cast Iron Pipe.—The strength exhibited by the pig iron market is helping the cast iron pipe makers to hold up their quotations. Orders during the past week showed considerable improvement, although there have been no large contracts yet made for gas pipe. The United States Cast Iron Pipe & Foundry Co. was awarded 1,300 tons of water pipe by the city of Madison, Wis., 300 tons of high-pressure pipe at Detroit, a similar quantity at Lennox, Ia., and 200 tons at Kansas City, Kan.

Merchant Pipe and Tubes.—Orders for merchant pipe are good and the local warehouses are obliged to make frequent requisitions on the mills in order to maintain their stocks.

Old Material.—Scrap prices have in some cases now reached levels lower than any touched during the past 10 years. The previous low point on No. 1 wrought in 1911 was $10.25 per net ton, f. o. b. Chicago. Sales have recently been made at $10 a ton and deals have been proposed at 25c under this figure. Arch bars and transoms, No. 2 wrought, cast and mixed borings and machine turns are also down to their previous low records. Chicago, Milwaukee & St. Paul will open bids, Oct. 9, on about 1,800 tons of various grades of old material, including 250 tons of No. 1 wrought, 300 tons of No. 2 wrought and 250 tons of frogs, switches and guards. The Santa Fe sold about 3,500 tons of scrap on Oct. 6, including 1,000 tons of No. 1 wrought and half as much No. 2 grade.

All Ore Contracted for will be Shipped

And the Movement for the Remainder of the Season Will Be Heavy—Slump in the Automobile Business

BY GEORGE SMART

Office of THE IRON TRADE REVIEW,
Penton Bldg.,
Cleveland, Oct. 7.

Iron Ore.—Ore shippers have notified owners that they will move all the ore contracted for and that they need expect no cut in allotments this fall. The announcement was a surprise to vessel owners, as they expected some of the business to be transferred to next season and were making plans accordingly. The change in the situation has stiffened the down freight market considerably, the grain rate advancing immediately to 2¼ cents. This determination on the part of shippers to move their full quota of ore will make the demand for vessel tonnage firm throughout the remainder of the season. Vessels will have all that they can do from now on until the close of navigation, and probably some fancy rates will be paid for late movement of grain. The finish would be a fine one, if the coal trade were lending any support whatever to the market, but receipts of coal at Lake Erie ports are so light that vessels are not waiting for cargoes. Fog, however, is delaying the fleet seriously in the rivers and accordingly no congestion obtains at upper lake docks, the vessels being loaded as soon as they arrive. If the total movement of ore does not reach 50,000,000 tons during the season, it will not fall far below that figure.

Pig Iron.—With consumers well supplied for the remainder of this year, a waiting policy has been inaugurated and new business is extremely light. Buying of large tonnages is not expected until the effect of the tariff has been determined to some extent. As long, however, as consumption is maintained, the feeling is that there is no cause for alarm.

Coke.—The coke market for both furnace and foundry grades is quiet and there are no changes in quotations. Many producers are still holding firmly for $2.50 for furnace coke for the remainder of this year and the first half of next, but coke analyzing less than 1 per cent sulphur and less than 12 per cent ash can be obtained at $2.15 to $2.20, ovens. Some producers insist, however, that the coke going at low prices is not fully up to standard as to structure.

Finished Material.—Buying in very small quantities characterizes the market to a greater extent. Some consumers who rarely place an order for less than a carload are buying as little as three or four tons. This hand-to-mouth policy is being generally followed, but stock accumulations are small and very large tonnages will be required when conditions change. Coal companies are buying light rails and other materials freely. The plate market is still weak and the 1.35c, Pittsburgh, quotation is more general. Buyers who are not always accorded the lowest price are said to be able to purchase at 1.35c. Some plate mills report the market as absolutely lifeless. The structural market is only fairly active, but most of the shops are busy and have enough orders on hand to keep them employed for several months. Bar iron is dull and the Empire plant is not running this week. Steel bars are firm at 1.40c, Pittsburgh.

Reports concerning the automobile business in Cleveland and other cities indicate a sharp decrease in business. Many employes have already been laid off and the outlook for the winter is not encouraging. The slump in the demand for automobiles is reflected in the decreased buying of iron and steel products used in their manufacture.

Old Materials.—The general level of prices in the scrap market has not changed during the past week. So little business has been transacted that quotations are for the most part nominal. Demand is light for all grades. Mills seem well stocked, and show little interest when concessions are offered. Heavy melting steel continues to be quoted about $10.25 to $10.75, although there have been few transactions at this figure.

Had Half a Million.—Henry Schoellkopf, late vice president and treasurer of the Wisconsin Engine Co., of Corliss, Wis., which failed shortly following his death by suicide early this year, left an estate valued at nearly $542,000. The inventory just filed shows personal property worth $537,284.75 and real estate worth $4,350. The suicide was attributed to the fact that Mr. Schoellkopf, who was the principal stockholder in the engine concern, found the investment to be unsatisfactory and unprofitable.

SOUTHERN COKE

Sold at St. Louis—Pig Iron Market is Very Dull.

BY E. C. ERWIN

Office of THE IRON TRADE REVIEW,
St. Louis, Oct. 7.

Pig Iron.—The local market is virtually devoid of inquiry for pig iron, except in small quantities for immediate shipment. A fair tonnage of malleable changed hands last week. Southern No. 2 is quoted at $11.50 to $12 for delivery over the remainder of the year, and agents are not taking on business beyond that period. Northern iron is firm at $15, Chicago, and $14, Ironton.

Coke.—There is an inquiry in the local market for 3,000 tons of 48-hour furnace coke for delivery in Omaha, which may be closed within a few days. Sales of 12,000 to 15,000 tons each of Roda and Stonega coke were made the latter part of last week for delivery to St. Joseph Lead Co., at Herculaneum, Mo., up to July 1, 1914. Connellsville and Virginia 72-hour foundry coke is quoted at $3 to $3.25, ovens, for prompt delivery and on contract, and 48-hour furnace grades at $2.25 to $2.50 for same deliveries.

Old Material.—Because of the fact that the railroads continue to dump scrap on the market, prices have declined somewhat. Lists are out today from the Missouri Pacific railroad for 1,400 tons; the Mobile & Ohio, 700 tons, and the Frisco for 300 tons, all to close within the next few days. Now that the tariff is settled, buyers seem to prefer to play a waiting game. Relaying rails are still in good demand, with a short supply. Few of the roads seem to be picking them up, and such as are, are using them for sidings.

Lake Erie Ore Receipts

Out of a total of 7,258,413 tons of ore shipped during September, 6,047,446 tons were received at Lake Erie ports, distributed as follows:

Ports.	Gross tons.
Buffalo	697,379
Erie	159,480
Conneaut	1,233,366
Ashtabula	1,258,741
Fairport	296,880
Cleveland	1,390,349
Lorain	650.908
Huron	97,326
Sandusky	.....
Toledo	212,865
Detroit	50,152
Total	6,047,446

The Bellevue Furnace Co., Detroit, is to add a story to its plant to make space for added business.

Cincinnati Market is Extremely Quiet

Melters Decline to Buy for Delivery After Jan. 1—Southern Prices Firm—Coke Market Slow

BY S. G. BACKMAN

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg.,
Cincinnati, Oct. 7.

Pig Iron.—The market has probably been as quiet during the past week as at any time within the last six months, which period includes the extremely dull season of last summer. Sales and inquiries are very scarce, and generally for small lots. The majority of melters in this territory have covered for their requirements for the last quarter, and since the present condition of the market does not warrant any advance in prices before the first of the year, these users are declining to make first half contracts until a little later on, when the future of the market can apparently be better judged. Most of the buying at the present time, therefore, is for immediate requirements, although several reasonably large orders have been taken for the first half. Several inquiries that have been before the dealers for several days have practically been withdrawn for the time being, which shows how carefully buyers are going about contracting for first half requirements and are merely feeling the market from time to time.

It now appears that southern Ohio No. 2 foundry iron can be had for both the last and first quarters at $14, Ironton. Furnaces in this district have been holding at $14, Ironton, for the last quarter only, but even this price for the first quarter also has not induced any buying. This market is not very strong, and gives no indication of advancing before the first of the year, if then, unless an unexpected buying movement develops.

Although practically all of the furnaces in both Alabama and Tennessee are not quoting below $11.50, Birmingham basis, for southern No. 2 foundry iron for either the last quarter or first half, it is quite probable that a few of them would accept $11, Birmingham, for the rest of this year. There is a little resale iron in evidence also that might be had at this figure, and, therefore, since transactions have been so few recently as to afford no real test, we continue to quote from $11 to $11.50, Birmingham basis, for the last quarter, and $11.50, Birmingham, for the first quarter or half, for southern No. 2 foundry iron.

No inquiries of any importance have been received during the past week, but dealers are still considering the following that have been in their hands for several days: One thousand tons of malleable iron from the Terre Haute Malleable & Mfg. Co., Terre Haute, Ind.; 4,000 tons of foundry iron, northern and southern, from central Indiana; 1,000 tons of the same grades from southeastern Indiana, and from 2,000 to 4,000 tons of foundry iron from an Indiana manufacturer, all for deliveries extending into the first half.

Coke.—Although the coke market continues to be slow, it has apparently lost none of its strength. It could not be expected that heavy sales would be made at this time of the year, as most of the foundries in this territory have closed for their requirements until next July and the furnaces are not due to begin buying before the next 20 or 30 days. Also some of the ovens are not any too anxious for new business, as there is a decided shortage of railroad equipment at the present time and producers are therefore supplying regular customers and old contracts before they care to take on new orders. Production has probably increased a little within the past month, which has caused the ovens to lower their prices on spot coke in certain instances, so as to move it as soon as possible. This is true especially in the Pocahontas district, where prompt furnace coke can be had from $2.25 to $2.50 per ton, ovens. Contract coke, in most cases, is being held at slightly higher prices than that for spot shipment.

Finished Material.—The local sheet market is very good, especially in regard to the local mill, which is receiving heavy specifications on both old and new contracts. Mill prices are rather firm at 2.20c on black sheets No. 28 gage and 3.25c on galvanized sheets, No. 28 gage, f. o. b. Newport (Ky.) and Cincinnati. A large number of orders are coming from jobbers who are apparently anxious to stock their warehouses before winter.

Warehouse business as a whole has probably been a little better within the past few days. Demands seem to be mostly on structural and concrete reinforcing bars. Transactions within the past month have been rather spotted, as they have at times been rather poor for a week or more, and then a small spurt would be realized. Prices are unchanged and fairly firm.

Old Material.—The general level of prices that has held for several months has at last been lowered, due to the continued inactivity in the market, and to the large surplus of scrap on hand. Prices have been doubtful for a long time, and in many instances it could be said that there was no actual level upon which they could be based, as the quotations depended entirely upon the conditions of the sales. This same condition still exists to a certain extent, but it is very apparent that dealers are not being offered as much and are accepting less than they were last week. Outside of occasional small demands for stove plate, there is no special inquiry for any one grade. Transactions are still very few and small, as consumers are continuing to buy mostly from hand to mouth in preference to closing for requirements for any length of time on an uncertain market.

Only Closed Shops Were Affected

With the settlement of the strike of the iron molders, coremakers and patternmakers in Cincinnati somewhat over a month ago, it now develops that practically the only foundries affected by this agreement were those operating closed shops. Most of the molders employed in the open shops went out when the strike was called, but these foundries apparently refused to concede, and it now appears that about 60 per cent of the iron molders, coremakers and pattern makers in this city are employed in open shops, which include the Modern Foundry Co., the Bullock Electric Mfg. Co., the Buckeye Steel Castings Co., the Peck-Williamson Co., the Laidlaw-Dunn-Gordon Co., the Elmwood Castings Co., the Lunkenheimer Co., and the John B. Morris Foundry Co. The strike at most of these places has been practically settled with the probable exception of the Laidlaw-Dunn-Gordon Co., where the union is making a strong fight because of the fact that this plant is a subsidiary of the International Steam Pump Co.

William H. Hibbard, founder and president of the Hibbard Mfg. Co., Brooklyn, N. Y., died recently, aged 70.

Little New Business Develops in East

Great Interest in the Tariff, But Definite Developments Are Lacking—English Prices Higher Than American

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
326 Real Estate Trust Bldg.,
Philadelphia, Oct. 7.

Tariff talk permeates the eastern iron and steel market. There is general discussion and canvassing of the possibilities for bringing in foreign pig iron, finished and semi-finished products under the schedule of sharply reduced rates, but there is an absence of definite information and actual transactions generally upon which to base any solid conclusions. It will probably be some weeks before the true effect of the changes can be realized, especially in steel products, owing to factors other than price which are involved. In pig iron a quotation on Middlesbrough iron to one buyer indicates this iron is still $1 to $1.50 a ton above the domestic product in the seaboard belt. With uncertainty so general all the markets are quiet on new business.

Pig Iron.—Whether due to the sentimental influence of the tariff or not, the pig iron market has quieted down considerably. Buyers seem to be holding off until the atmosphere clears and they can see just how free pig will affect the market. One Delaware river pipe maker sounding out the English market has been quoted 64s on docks at Philadelphia, or about $15.60 for No. 3 Middlesbrough. This is equivalent to $16.10, delivered, without middlemen's commission. By reason of the differences in quality, this price is regarded as from 50 cents to $1 a ton above northern No. 2X at this buyer's plant. To consumers further inland, the advantage in favor of the domestic product is from $1 to $1.50 at ruling prices. Though some sales of northern No. 2X are being done at $16.50 and higher, this district, a few brands are still offered below $16. The National Radiator Co., which has been figuring on 6,000 tons of foundry iron for first half for Trenton and Johnstown, is holding off from closing. The Standard Cast Iron Pipe & Foundry Co. has closed against its inquiry for 5,000 tons of forge and No. 3 for October-November shipment, part of this business going to a Schuylkill valley maker at $15.25, delivered. Another pipe maker took about 1,000 tons. Steel making irons show slight activity. A central Pennsylvania steel maker took 700 tons of prompt basic at $15.75, delivered, or $15 at the seller's furnace, and 200 tons of off-basic at $15.50, delivered. Basic is now quotable at $15.50, delivered, minimum. The Jones & Laughlin Steel Co., which was inquiring for 1,000 tons of low phosphorus, has placed this order in the valleys. A steel foundry in this district and a Milwaukee consumer still figure on 1,000 tons each of this grade. Standard low phosphorus remains quotable on small sales at $23 to $23.50, Philadelphia. Lebanon brands seem stronger at $18, furnace. A buyer in this district has taken several thousand tons of forward malleable at slightly above $16.75, delivered.

Iron and Steel Bars.—Two buyers in this territory contracted in the week with middle western mills for a total of about 1,200 tons of steel bars for first half at 1.40c, Pittsburgh. The market is firm at this price. Business is quiet and specifications are only fair. Bar iron is not holding up to the improvement noted last month. Prices range from 1.25c to 1.35c, mill.

Plates.—Tonnage is lacking in the business now going to eastern Pennsylvania plate makers, but orders are quite numerous. The railroad requirements are noticeably small. Awards of ship work continue to be withheld, though a number of inquiries are pending. Generally the plate market shows a price of 1.40c, Pittsburgh, but here and there buyers have been reporting their ability to do 1.35c to 1.50c, Philadelphia. Mill operations are more irregular.

Structural Shapes.—One eastern mill has been quite freely offering 1.35c, Pittsburgh, or 1.50c, Philadelphia, and is reported even to have entered small lots upon this basis. Other eastern makers are still hesitating whether to meet this price. New inquiry and sales are light and the mills are operating at from about 60 to 70 per cent.

Sheets. — The eastern market for heavy sheets is less active. Prices, however, still hold around 1.65c, Pittsburgh, or 1.80c, Philadelphia, for No. 10 gage blue annealed.

Semi-Finished Steel. — The eastern market for semi-finished steel is attracting much attention, as it is generally believed the free-listing of this product will lead to increased importation of this material. Both sellers and consumers are busily sounding out the possibilities for bringing in English and German steel, but a great deal of indefiniteness still exists as to just what can be done in the way of prices abroad, in freights, etc., which probably will not be cleared up for some weeks. Beyond the report that a buyer in Virginia has taken a trial lot of small German billets, no actual transactions are learned. One eastern Pennsylvania buyer, it is known, is figuring with foreign mills for 5,000 tons of billets. Quite curiously at this stage, the domestic market has shown more activity. Sales have been heavier, one maker having sold several thousand tons in moderate lots, 1,000 tons of which are for New England, on the basis of about $25, delivered, this district. One lot of 2,500 tons for this district, taken by another maker, was done at $24, Pittsburgh, or $26.40, delivered. An order for 3,000 tons of steel skelp, asked for a Glasgow, Scotland, buyer, went to German makers, who considerably underquoted American mills.

Old Material.—The expectation of a stronger market in old materials freely held by dealers in this district up to a short time ago has now disappeared and prices have weakened considerably. An eastern Pennsylvania steel maker, who paid $12, delivered, for a round block several weeks ago, purchased during the past week about 4,000 tons of heavy melting steel at $11.25, delivered. The railroad lists just closed, which last month brought $12.50 for steel and $15.25 for No. 1 railroad wrought, were distributed at not over $11.75 for steel and $14.25 for wrought. Borings have been done at $8, delivered, and wrought pipe is lower. Consumers are buying sparingly.

Dismantle Rolling Mill

The rolling mill plant of the Boonton Iron & Steel Co., Boonton, N. J., is being dismantled. Part of the equipment has been sold to the Rockaway Rolling Mills, Rockaway, L. I. The Boonton plant consisted of nine double puddling furnaces, four heating furnaces and three trains of rolls. Its annual capacity was about 25,000 tons of bars. It was operated up until a few months ago.

Three parcels of land aggregating 40 acres have been bought by the United States Steel Corporation adjoining the new steel town, Ojibway, opposite Detroit.

The Brennan-Smyth Steel Castings Co., Cleveland, has changed its name to the Brennan Steel Castings Co., and has reduced its capital from $200,000 to $30,000.

Light Sales of Pig Iron in New York

Discussion as to Effects of Tariff—Government Preparing to Sell Large Quantities of Scrap—Warehouse Prices Reduced

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
503-4 West St. Bldg.,
New York, Oct. 7.

Iron Ore. — Eastern consumers of foreign ore other than Cuban, are being given the benefit of a 15-cents-per-ton reduction in the duty on the unshipped tonnage in their present contracts. The reduction on Cuban ores is 12 cents. In these transactions, changes of duty all have been made to the account of the buyer. The free-listing of foreign ore, as it involves so small a change in the duty, is regarded as largely a nominal matter.

Pig Iron.—Buyers in this and other districts adjacent to tidewater show more or less informal interest in the possibility of obtaining foreign iron to advantage. It is generally appreciated that for the average foundry, the importing of English iron would probably not be practicable. It is believed, however, that the menace of foreign competition will act as a preventive of unusually high prices and serve as a leveller of the domestic market. Trading conditions in this district remain very monotonous. Sales are light and usually small. A Connecticut jobbing foundry asks 1,000 tons of No. 2X for first quarter. A Dover, N. J., furnace manufacturer, is inquiring for 1,000 tons of No. 2 plain for first quarter. The Lackawanna railroad wants 400 tons for Scranton, and another Jersey buyer 300 to 400 tons. Prices show less firmness. Buffalo No. 2X, after having been quoted and sold up to $14.50, furnace, is now freely available at $14, furnace, or $15.75 in Jersey tidewater districts for this year or first quarter. A Brooklyn buyer took a small lot of 3 per cent silicon for first quarter from a Buffalo maker at $16.70, delivered, or $14.25, furnace. Eastern Pennsylvania irons are quoted from $16 to $16.50, tidewater.

Ferro-Alloys.—Little forward buying is being done in ferro-manganese and there is an inclination of some interests to believe that this can only be stimulated by lower prices. Small sales for early delivery are being done at $50, seaboard, duty free. Consumers are being given the benefit of the $2.50, reduction in the duty on the undelivered portions of running contracts. Several thousand tons of ferro-manganese remain in the market, but some of this is inactive. Considerable activity has been shown by 50 per cent ferro-silicon. Inquiries are pending for 300 to 400 tons and it is not believed that the reduction from 20 to 15 per cent in the duty on this alloy will have much bearing upon the market.

Plates.—The Standard Oil Co. has placed a tank steamer of large size with the Newport News Shipbuilding & Dry Dock Co. About 4,000 tons of steel, largely plates, will be required and this material will be furnished by eastern and Pittsburgh mills. The car market is more active than it was a month ago, but still remains comparatively quiet. New plate tonnage is moderate. Business is usually being done at 1.40c, Pittsburgh, but larger buyers indicate their ability to do 1.35c.

Structural Material.—Further price easiness has developed in plain material and at least one of the eastern Pennsylvania mills now is taking orders quite freely at 1.35c, Pittsburgh, or 1.51c, New York. Other makers are not inclined to freely make concessions, but are meeting the situation. Most tonnage seems to be going at 1.40c, Pittsburgh. The market remains extremely quiet in this district.

Cast Iron Pipe.—Inquiries have been put out for 7,000 to 8,000 tons of pipe for reconstruction work in Mexico. A further heavy tonnage from that country is expected when normal conditions prevail. The United States Cast Iron Pipe & Foundry Co. and the Standard Cast Iron Pipe & Foundry Co. have divided 2,200 tons of 6 to 20-inch pipe for Queens, the contract for which was placed with the Beaver Engineering Co. A letting of 1,270 tons of eight to twelves for Manhattan closes Oct. 15. Fall River, Mass., takes bids Oct. 8 on 500 tons. Private buying has been a little more active. New tonnage, however, is only fair. Prices remain irregular.

Warehouse Prices. — The readjustment of warehouse prices in this district has been made, steel bars for New York delivery now being quoted at 2.00c, and plates and shapes at 2.05c. The former prices were 2.05c for bars and 2.15c for plates and shapes.

Iron and Steel Bars.—There is some holding up of specifications in steel bars and new business is light, some buyers apparently expecting lower prices. The market seems firm at 1.40c, Pittsburgh, however. Stone & Webster, Boston, who have been figuring on 1,000 to 5,000 tons of reinforcing bars, still hold this matter in abeyance. Shafting prices show more variance. Iron bars are not moving very briskly. Prices for the better grade remain 1.35c to 1.45c, New York.

Old Material.—The government is about to make arrangements to market large quantities of scrap, which have collected in the Panama canal. Some official offers of this tonnage are expected to be issued soon. Except in cast scrap and stove plate, especially the latter, which is in demand, the market is slow. Mixed iron has been bringing $7.75 to $8.75, New York, and in some Jersey points $12.75 for heavy cast is being obtained. Heavy steel is sold at lower prices in eastern Pennsylvania, but dealers in this district who have old orders still find trouble to cover.

BUFFALO FOUNDRIES

Are Busy, but Buying of Pig Iron is Light.

BY FRANK R. DOLBEE

Office of THE IRON TRADE REVIEW,
Buffalo, Oct. 7.

Pig Iron.—The week's placement amounted to about 10,000 tons of all grades. While the market is quiet and the only buying done came from melters who needed iron for immediate consumption, and the attitude of the consumers is plainly to await further developments from the passage of the Underwood tariff, the furnaces are holding firmly to previous prices. In fact, some of the iron booked during the week was at prices which increase the spread on No. 1 foundry and stiffen the maximum from $14.75 to $15; while gray forge quoted a week ago at $13.50 to $13.75 is now held at $13.75 flat, and the minimum on malleable has softened, giving it now a spread of $14 to $14.50.

Reports indicate that a majority of the foundries of the district are all busy and also that in many instances they are operating with decidedly small stocks on hand. This has caused considerable pressure on the furnaces for iron under contract. Since the enactment of the tariff, a number of users have made offers to buy iron at what they estimated would be the price which the tariff will establish, but such negotiations have been turned down by the furnaces. The sentiment of the producers seems to be that the prevailing schedule is about as low as they care to go and as low as they will have to go, and that if they cannot place iron at present prices, they

will put their stacks out of blast. There has been no recent curtailment of production, but the continued inactivity of the market is apt to cause a number of furnaces to go out of commission.

Finished Material. — Prices showed strength throughout the week, notwithstanding the enactment of the tariff. The disposition of the mills and agencies of the district is to figure that the tariff has been discounted by the trade. A good flow of orders materialized, coming from people who require material for prompt delivery. The inquiry on bars was fair, while the demand for shapes and plates was somewhat lighter. In the latter commodity, prices eased to 1.40c, base, and that price is being generally held. Shapes are bringing 1.45c, base, and bars are moving freely at 1.40c. Several thousand tons of wire and wire products were placed during the week. The movement has been very satisfactory. List prices are being obtained without the making of concessions. Wire is firm at 1.45c and wire nails at 1.65c, base. Specifications are coming in at a normal rate and no cancellations have been reported, while in some cases consumers have asked to have deliveries extended slightly.

Old Material.—The lull in the scrap market continues. It has not caused prices to soften, as the dealers are still holding to their schedules previously quoted. There has been some activity locally in cast scrap, but the principal trading has been in turnings and borings. The general market situation remains the same as it was a week ago, with the exception of the movement of some heavy melting steel from this district to consumers in the valley.

Advanced Prices for Southern Iron

Paid on Limited Tonnages Sold at Birmingham — Prompt Deliveries Accepted by Consumers

BY W. B. NEAL

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., Oct. 7.

Pig Iron.—The pig iron market has been more or less quiet during the week just past. The total tonnage disposed of amounts to some 10,000, most of which was booked for delivery within the last quarter. However, there was some tonnage booked for delivery during the first quarter of 1914 at a price ranging from $11.75 to $12 per ton, No. 2 foundry basis, f. o. b. cars at the furnace. One large interest reports the sale of 2,000 tons of high silicon iron at $12.50 per ton at the furnace for prompt shipment. Two lots of 1,000 tons each were entered for first quarter, 1914, delivery, and 5,000 tons entered, in 250 and 500-ton lots, for last quarter, 1913, delivery; also 1,000 tons of special analysis iron was engaged for delivery in January, February and March of next year at a price varying from $12.25 to $12.75 per ton, f. o. b. cars at the furnace. One of the large producing interests of the district reports that its yards are now clear of accumulated stocks, except perhaps a small tonnage of mottled iron, and the make of furnaces is being shipped from day to day straight from the block. Another producing interest says that reductions have been made in stocks since the last compilation, yet at this time shipments are not equal to the make. All of the furnace interests report that buyers are calling for their iron, which goes to show that more or less of a "hand to mouth" policy is being pursued by melters. Another contributing factor to the steady movement is the approach of the cotton season, at which time the railroads are short of all kinds of equipment. This situation is becoming acute, and the farsighted buyers are taking advantage of the situation.

Cast Iron Pipe.—Some of the plants are now well supplied with large orders, that insure long and continuous operations, as per reports. Large tonnages of cast iron pipe for Alton, Ill., the northwest and Panama, aggregating a large tonnage, are reported as being awarded to three of the United States Cast Iron Pipe & Foundry Co.'s plants of the districts. Other plants of similar output still continue to operate with small orders, stocking much of their make, until they, too, are more favorably supplied with orders.

Old Materials.—The scrap iron market has not shown as much activity for the week, as at last report, yet inquiries are numerous and some 300 tons were sold during the week. Good large supplies are in the hands of the dealers. A firm market at prices quoted is prevailing.

BRITISH IRON TRADE

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Sept. 27.

The position with regard to pig iron does not improve. The best that can be said about it is that prices have not fallen, but this is solely because any further reductions would be ruinous, as selling prices are already below the profit margin. There has been a reduction in stock this week, the total now being 172,000 tons. But, in Middlesbrough, it is suggested that this reduction is due to the fact that makers are storing their iron in their own yards, rather than placing it in the public stores. Several furnaces have been put out of blast, and the position has been aggravated by the stoppage of several steel foundries in the Sheffield district through a strike of molders. Prices are about what they were last week. The price of No. 3 at Middlesbrough is 54s 9d ($13.40) with 55s ($13.46) one month, and 55s 9d ($13.66), two months. In the hematite trade there has been rather more activity, so that the quotation of 66s ($16.16) is a firm figure. Four hematite furnaces on the east coast are about to be damped down, and this must have a hardening influence on prices. The market has been further depresed this week by the unsatisfactory reports both from America and the continent.

No improvement can be noted in any branch of the finished iron and steel trade. With regard to finished iron in the Midlands, the bear movement continues to achieve considerable success. This is especially true of unmarked bars which not long since were £8 5s ($40.40). Five weeks ago makers positively asserted that £7 10s ($36.72) was the minimum. The same people have this week sold £7 2s 6d ($34.88). Even in the galvanized sheet trade, which has lately experienced a decided improvement in the volume of business, there is a good deal of price cutting. It has been found impossible to maintain the minimum of £11 ($53.88) and business has been done this week at £10 17s 6d ($53.28). The same sort of weakness is shown in practically all branches of the iron trade. In the steel trade, competition from Belgium has become extremely keen, and this applies not only to unfinished steel but to finished goods of various kinds. Belgium has been sending us a great many wire rods, but now has apparently become a serious competitor for the finished article, and is sending not only finished wires but wire nails.

BETTER TONNAGE

Being Offered to Fabricators in the East—More Activity at Chicago.

A little better tonnage is being offered to fabricators for figures in some eastern districts, but the situation generally shows modest activity. New York City is still very quiet. Awards throughout the east remain very small. It has been finally settled that the Ford Motor Co. building at Philadelphia will go concrete and the steel requirements will be much reduced.

About 7,500 tons of plain material will be required for fabricating contracts reported let in the west during the past week. This is considerably more than has appeared during any previous week in the last two months. It is also interesting to note that the railroads are well represented in the current orders. Fabricators are not getting business in sufficient quantities to satisfy their capacity and there is a tendency to slash prices on attractive jobs. It is known that the competition for the Crane Co.'s shops, let to the American Bridge Co., was very keen.

A couple of rather attractive contracts have been taken by fabricators in the Pittsburgh district this week. The McClintic-Marshall Construction Co. will furnish the steel for several additional buildings for the new plant of the Otis Steel Co., Cleveland, and the American Bridge Co. has taken a contract for a Pittsburgh & Lake Erie railway bridge at Lowellville Junction, O. The Riter-Conley Mfg. Co. is low bidder on part of the riveted steel pipe for another section of the Los Angeles aqueduct.

CONTRACTS PLACED.

Additional buildings, machine shop, boiler house, etc., Otis Steel Co., Cleveland, 1,000 tons, the McClintic-Marshall Construction Co.

Bridge for M. P. & L. E., Lowellville Junction, O., 600 tons, the American Bridge Co.

George Lomax, theater building, Ashland avenue, near Madison street, Chicago, 279 tons to the South Halsted Street Iron Works.

Rice-Stix Dry Goods Co., St. Louis, 10 story mercantile building, St. Louis, Mo., 1,800 tons of steel bars for reinforcing concrete.

Panama Pacific Exposition, steel dome for horticultural house, San Francisco, Cal., 535 tons to Dyer Brothers.

Chicago & Western Indiana Railroad Co., locomotive shops, Clearing, Ill., 881 tons to Lackawanna Bridge Co.

Chicago Burlington & Quincy Railroad Co. deck and through plate girder spans, 1,022 tons, to the American Bridge Co.

Crane Co., Chicago, structural steel for new plant, Chicago, 2,728 tons to the American Bridge Co.

Addition to Taylor store, Cleveland, 750 tons, to George A. Fuller Co.

CONTRACTS PENDING.

Ford Motor Co. building, Philadelphia, now finally revised for concrete construction. Steel requirements cut down to 1,500 to 2,000 tons, largely columns, and understood Bethlehem sections will be used.

High School, Binghamton, N. Y., 1,000 tons. Bids asked for.

Tressle work for New Jersey Zinc Co., Palmerton, Pa., 1,200 tons. Revised inquiry issued. Bids being taken on delivered material alone.

RAIL ORDER

Closed by the Burlington—Other Rail Tonnages Pending.

In the west railroad buying has shown some slight increase, but is still very limited. Comparatively speaking, there is practically no inquiry for cars and most of the western systems seem supplied with motive power. Most of the car business is confined to passenger cars.

CAR AND LOCOMOTIVE INQUIRIES.

The Buffalo, Rochester & Pittsburgh railroad is negotiating for 1,000 gondolas.

The Great Northern is in the market for 130 passenger cars of all steel construction.

Chicago Milwaukee & St. Paul is inquiring for ten 60-foot mail cars.

The Northwestern system is in the market for 101 passenger cars of all steel construction.

CAR AND LOCOMOTIVE ORDERS.

The Peking-Kalgan Railway of China has ordered five super-heater Pacific passenger locomotives and four superheater Mikado freight locomotives from the American Locomotive Co.

The Dominion Coal Co., Ltd., has ordered one consolidation freight locomotive from the Montreal Locomotive Works.

The San Pedro, Los Angeles & Salt Lake railroad has placed three switching locomotives with the Baldwin Locomotive Works.

The Atlantic Northern railway has placed one Mogul type locomotive with the Baldwin Locomotive works.

The Cambria & Indiana railroad has ordered one locomotive of the Mikado type of the Baldwin Locomotive Works.

RAIL SALES AND INQUIRIES

The Chicago, Burlington & Quincy railroad, 25,000 tons of rails for next year's delivery, placed with Illinois Steel Co.

Great Northern railroad, 20,000 tons of rails for next year's delivery, placed with Illinois Steel Co. and 5,000 tons each for this year's delivery will be given to the Lackawanna Steel Co. and the Bethlehem Steel Co.

Pierre Marquette railroad, 10,000 tons of rails asked for early shipment.

BRIDGE AND STRUCTURAL WORK.

Section No. 2 of the Seventh avenue subway line, New York City, 6,500 tons. The Thos. J. Buckley Engineering Co., lowest bidder. Contract not yet awarded.

Norfolk & Western railroad power house, 500 tons placed with Phoenix Bridge Co.

The Baltimore & Ohio railroad is preparing plans for a bridge over the Potomac river, which it is expected will call for a large tonnage of steel.

Section Los Angeles aqueduct, 2,500 tons riveted steel pipe. The Lacey Mfg. Co. and the Riter Conley Mfg. Co. are low bidders on parts of the contract.

City bridges, Philadelphia, about 600 tons, steel work placed with McClintic-Marshall Construction Co.

Pennsylvania railroad, draw bridge and other small bridge and structural work on eastern divisions. Several hundred tons required. Inquiries issued.

METAL MARKETS

New York

Oct. 7.

Copper.—Demand for all kinds of copper is very dull. Producers and leading selling agencies continue to quote 16.87½c, 30 days delivered, New York, on electrolytic. Second sellers have sold small lots at 16.62½c, cash, but they are now being bid 16.50c cash. The best brand of lake is held nominally at 17.50c, cash, but little is to be had. Slightly inferior grades of lake are held by producers at 17c to 17.25c but this quotation is also largely nominal. Some of the poorer brands of lake are being sold at 16.62½c, to 16.75c, cash. Casting is held by producers at 16.85c but may be obtained from second sellers at 16.37½c to 16.50c.

Standard copper closed on the London exchange today at £73 7s 6d for spot and £73 5s for three months, a gain of £1 from last Tuesday's close. No bids were made on the New York exchange today; 16.75c was asked for October, November and December. Exports so far this month are 5,054 tons.

Tin.—This metal is weak and demand is quiet. Some sales were made this morning at 40.37½c. This afternoon the spot price was 40.50c but no sales were made. Today's close on the London exchange was £184 15s for spot and £185 for three months, which is £3 5s lower than a week ago. Tin arrivals so far this month are 595 tons, while 3,020 tons are afloat.

Chicago

Oct. 6.

New Metals.—Copper prices are nominally strong but the consumptive demand is dull and inactive. There is a considerable spread in copper quotations. Spelter is sinking rapidly and unless the decline is checked, all of the recent advance will soon be wiped out. Lead is also soft. Tin is weak in sympathy with the New York market.

We quote dealers' selling prices f. o. b. Chicago as follows:

Lake copper, carload lots, 17c; casting, 16⅝c; smaller lots, ¼c to ⅜c higher. Spelter, car lots, 5.50c; lead, desilverized, 4.55c; sheet zinc, $8.00, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 41c; Cookson's antimony, 8½c; other grades, 7½c.

Old Metals.—Prices of old metals are practically unchanged but the market appears to be a little weaker. Zinc and lead are particularly soft. Sales are at a minimum and inquiry is light. Sentiment among the dealers is distinctly less optimistic.

We quote dealers' selling prices f. o. b. Chicago, as follows:

Copper wire, crucible shapes, 14½c; copper bottoms, 12¼c; heavy red brass, 13¼c; heavy yellow brass, 8½c; No. 1 red brass borings, 11½c; No. 1 yellow brass borings, 8c; brass clippings, 10c; lead pipe, 4¾c; zinc scrap, 4½c; tea lead, 4c; No. 1 aluminum, 16½c; No. 1 pewter, 28c; block tin pipe, 36½c; tin foil, 32c; linotype dross, 3¼c; electrotype dross, 3¼c; stereotype plates, 4¾c; stereotype dross, 3¼c.

TARIFF EFFECTS

Being Considered in the East—Many Factors Involved.

Philadelphia, Oct. 7.—So much indefiniteness still surrounds the relation of foreign and domestic finished and semi-finished steel products in the eastern market that it is impossible at this stage accurately to gage the exact effect of the new tariff.

There is a general scurrying among importers, merchants and brokers to size up the situation and make such connections with foreign makers as will give them an opportunity to offer the products of these plants to consumers at definite terms. There is an equally active interest shown by eastern steel makers for every scrap and particle of information bearing upon the situation which will enable them to determine what they will be obliged to face under the new conditions and to shape their policies accordingly. Everywhere there is a lack of a positive and reliable knowledge of ocean freights from various foreign parts, of foreign prices, standards and quality and other details that bear upon the competitive strength of trans-Atlantic materials.

This condition seems to be the natural result of the absence of sales of foreign material which can be directly attributed to the new tariff and in some cases to a lack of such commerce between certain foreign and eastern ports as would tend to demonstrate the freight situation. It is believed that this unsettled condition of affairs will continue for some weeks until definite arrangements shall have developed to afford a true line upon the possibilities of the present and the future.

Germany, Belgium and England are looked upon as the nations from which an importation movement of steel products will probably originate, if at all. The belief is also generally held that billets, sheet bars and other forms of semi-finished steel under free duty are more likely to be imported in quantity than plates with 12 per cent duty, structural shapes with 10 per cent and steel bars with 8 per cent. Smaller foreign billets, that is, the 2 x 2-inch and under sizes, it has been found in the past, find a better market in the east than the larger sizes. Foreign billets, because of the basic-Bessemer process, are generally higher in phosphorus than the American product. Likewise they analyze higher in sulphur. Eastern consumers who have used German billets in years past, however, pronounce them of very good quality. A report is current that a Virginia horseshoe maker has purchased a lot of small German billets for trial. Eastern horseshoe makers have imported more or less foreign steel in the past, particularly for the manufacture of orders for foreign shipment where the drawback of the duty was allowed.

MANY TROUBLES

In Enforcing the Tariff Law—Imports in Warehouses.

Washington, Oct. 7.—With the Underwood-Simmons tariff law becoming operative last Saturday, the scene of action was shifted from congress to the treasury department to enforce the law with its complexities which will have to be ironed out. Already protests of various kinds as to interpretations are being filed with the treasury officials.

Owing to the expectation of the passage of the lowest tariff law in the history of the country with the exception of the Walker law of 1846, and its amendatory tariff of 1857, the bonded warehouses of the country had been flooded with importations awaiting release when the reduced duties went into effect. Customs officials in increased number were pressed busily into action, as soon as the law became operative, getting the goods out, a task which will require their energetic efforts for some time to come.

The free list of the law is as follows:

Transferred to the free list by house: Cash registers, linotype and all typesetting machines, printing presses, sewing machines, typewriters, cotton ties, iron ore, cut nails, cut spikes, etc., spikes, horseshoe nails, hobnails, etc., wire nails, etc., horse and mule shoes, etc., cut tacks, brads, or sprigs, railway bars, etc., barbed and all other fence wire and wire fencing, tungsten-bearing ores of all kinds.

Transferred to the free list by the senate: Pig iron, kentledge, spiegeleisen, scrap, ferro-manganese, slabs, blooms, loops, or other forms less finished than pig iron, except castings, steel ingots, cogged ingots, blooms and slabs, die blocks or blanks, billets, if made by Bessemer, open-hearth or similar processes, ingots, cogged ingots, blooms and blanks for wheels for railway purposes, without regard to degree of manufacture, antimony ore, stibnite and matte, containing antimony, but not containing more than 10 per cent of lead.

HOPEFUL VIEW

Taken by Chairman Topping, of the Republic Company.

"With the tonnage at present on books of steel works throughout the country insuring some weeks of active operations, I am strongly of the opinion that considerable new tonnage will come out just as soon as the buyer is satisfied what measure of readjustment of values is necessary under the new order of things."

With these courageous and hopeful words, Chairman John A. Topping, of the Republic Iron & Steel Co., submitted to an interview regarding prospects for the iron and steel trade of the United States under the influence of the new tariff bill.

Mr. Topping made it clear throughout the course of the interview that, although he had appeared before the Penrose committee of the senate in advocacy of the retention of a protective tariff duty and had put forth a strong general defense of the theory of a protective iron and steel tariff, yet he feels the American steel-maker, under the new tariff and under the stimulus of new buying that must come to fill greatly needed requirements, will readjust himself to fit the new facts and will do his best to hold his own.

He declared himself of the opinion that Wall street "bears" have rather overworked the stories of a foreign invasion of our domestic steel markets. He does not share wholly the views reported to have been expressed recently by Mr. Schwab; on the contrary, he is less disturbed over the prospects of foreign competition than he is over competition at home. Furthermore, while Germany is the most important producer of steel abroad, yet her total output is less than one-half that of the United States, and as Germany consumes at home about one-half of her production, the amount available for export, even if all were shipped to the United States, would be less than one-fourth of requirements here. It is not, however, at all likely that Germany would prefer our markets to the exclusion of her old and established foreign trade, as the United States market could not be obtained except at a tremendous sacrifice in German profits, because to enter this market would mean sales by Germany at substantially cost and the abandonment of Germany's old trade at remunerative rates. He said further:

"In my opinion the principal effect of the new tariff bill will be to bring domestic markets in much closer re-

lationship with the markets of the world, and that ultimately stability to the values of domestic steel products will obtain in this market, as wide fluctuations will be minimized under a low tariff."

"It is my opinion," said Mr. Topping, "a proper banking and currency bill is of far more importance to the future of the steel trade than the tariff bill, and if the bankers obtained a modification of the Owen-Glass bill, as has been recommended, the way will be paved for a forward business movement. For it is well to bear in mind that stocks of merchandise in this country are thoroughly liquidated in anticipation of the change in tariff."

Dr. Diesel Lost at Sea

Dr. Rudolph Diesel, of Bavaria, disappeared from the steamer Dresden

RUDOLPH DIESEL

en route from Antwerp to Harwich, in the most mysterious manner on the night of Sept. 29. He left Antwerp to attend the annual meeting in London of the Deisel Engine Manufacturers, and was traveling in company with George Carels and Herr Luckmann, chief engineer of the Diesel company. Upon arrival of the steamer at Harwich, Dr. Diesel was nowhere to be found. He had a cabin to himself, but the bed had not been slept in, though his night attire was laid out and his watch was hanging from his traveling bag in such a position that he would naturally see it from where he lay in bed. The last person to see Dr. Diesel was George Carels. Luckmann, Carels and Diesel dined together after the boat left Antwerp. They strolled about the deck until ten o'clock, when they all descended to their cabins, Dr. Diesel bidding Carels good night at his cabin door. In the morning when the discovery was made that Dr. Diesel's bed had not been slept in, a search was made of the ship, but he could not be found, and as his landing ticket had not been given up, it was certain that he had not landed. The conclusion is that after Dr. Diesel had bidden his companions good night, he resumed his stroll about the deck and must in some unaccountable manner have fallen overboard.

ENGLISH PIG IRON

Unable to Compete With American Under Present Conditions.

Philadelphia, Oct. 7.—Eastern pig iron markets at this time, notwithstanding their loss of protection, under the new tariff law, are secure by a comfortable margin against foreign competition.

This conclusion arises from the most authentic and complete information bearing upon this question that now is available. For the present it offers definite ground in a problem which has become of the greatest immediate importance to producer and consumer alike in the extensive market embraced by the Atlantic seaboard belt with its densest point at Philadelphia and vicinity.

Middlesbrough, English, iron, the most important foreign source of American supply from an eastern standpoint is still, with duty free, from $1 to $1.50 a ton in price above its equivalent northern No. 2 in eastern seaboard territory. This comparison in favor of the American product is based upon a definite accounting of every factor involved in the traffic by sellers who have had the widest experience in past years in bringing in Middlesbrough iron to this country. In 1906 and 1907, the tonnage of English iron handled by these interests reached into the many thousands. Since then, very little Middlesbrough iron has been brought in.

Mr. Drummond Retires

Thomas J. Drummond retired both as president and director of the Lake Superior Corporation at the annual meeting of the company which was held at Camden, N. J., Oct. 1. J. F. Taylor, of Sault Ste. Marie, who has been vice president and practically general manager of the company there, has been made president. Mr. Drummond has not been in good health for some time, and this fact impelled his resignation.

W. K. Whigham, of London, has been made chairman of the board of the Lake Superior Corporation and the other officers elected apart from Mr. Taylor are as follows: Henry Coppell and W. C. Franz, vice presidents; Thomas Gibson, secretary; Alexander Taylor, assistant secretary, and A. H. Chitty, treasurer. The directors include besides the officers Frederick McOwen, of Philadelphia; John T. Terry and Joseph S. Dale, of New York; W. E. Stavert and D. C. Newton, Montreal, and James Hawson, of Sault Ste. Marie, Ontario.

Death of Wm. J. Isaacson

William J. Isaacson, for 21 years a resident of Cincinnati, passed away in Los Angeles, Cal., Sept. 13. Mr. Isaacson was born in Christiana, Norway,

THOMAS J. DRUMMOND

in 1848. His family came to Brooklyn, N. Y., in 1851, and in the following year established their home in New Haven, Conn. As a boy he enlisted in the Twentieth Connecticut Volunteer Infantry in 1862.

Mr. Isaacson was engaged in the iron and tin plate business in the United States and England, residing in Liverpool for 14 years. In 1885 he became managing director of the Dayton Coal & Iron Co., of Cincinnati and Dayton, Tenn. For 21 years he remained in this position, residing in Cincinnati, and was well known in the iron trade of the middle west. In 1906 he retired from business on account of failing health. The end came after eight months of illness in California. He is survived by a widow and one son.

Average Daily Pig Iron Production Shows Gain

Check in Retrograde Movement Witnessed in September, Although Output is Less, Due to Short Month—Steel Works Stacks Make Increase

The steady decline in blast furnace activities, in evidence since April, was checked in September, when the average daily production of coke and anthracite pig iron showed a gain over August of 1,298 tons, the figures for the two months being 83,137 and 81,839 tons, respectively.

MONTHLY PRODUCTION.

	1913.	1912.	1911.
January	2,787,800	2,052,806	1,766,658
February	2,578,670	2,098,796	1,781,285
March	2,762,823	2,411,529	2,165,764
April	2,754,353	2,377,621	2,044,904
May	2,816,825	2,503,341	1,871,388
June	2,616,883	2,433,737	1,773,282
July	2,558,275	2,402,567	1,776,108
August	2,537,018	2,500,163	1,921,832
September	2,494,098	2,444,454	1,973,918
October		2,683,645	2,092,061
November		2,639,562	1,999,100
December		2,777,292	2,032,301
Totals	23,906,745	29,325,513	23,198,601

The gross production in September was less than in August, due to the shorter month. The output last month was 2,494,098 tons against 2,537,018 tons in August, a decline in September of 42,920 tons.

Blast furnace activities are practically the same as in September of last year, last month showing the smallest production of any like period since the corresponding month of 1912. The average daily output of the two months was practically the same while there is a difference of only four stacks in the number of active furnaces, 262 being in blast on Sept. 30, 1912, compared with 258 on Sept. 30, 1913.

The output of merchant iron in September was 638,134 tons, against 659,363 tons in August, a loss of 21,229 tons. The steel works or non-merchant furnaces produced 1,828,882 tons in September, compared with 1,856,975 tons in August, a loss of 28,093 tons, due to the shorter month.

In average daily production, the steel works furnaces showed a gain of 1,061 tons, the average in September being 60,963 tons compared with 59,902 tons in August. The merchant stacks maintained the same rate of output in both months, showing an average daily production of 21,271 tons in September and 21,270 tons in August, a difference of only one ton.

There was a net loss of two in active stacks, comparing the last days of August and September, 258 being in blast Sept. 30 and 260 on Aug. 31. Of the merchant furnaces three were relighted and four blown out, a net loss of one. Four steel works furnaces were put in blast and five blown out, a net loss of one. In all, seven stacks were relighted and nine blown out.

AVERAGE DAILY PRODUCTION.

	1913.	1912.	1911.
January	89,929	66,220	56,989
February	92,095	72,372	63,617
March	89,123	77,791	69,863
April	91,812	79,254	68,163
May	90,865	80,753	60,367
June	87,229	81,125	59,109
July	82,525	77,502	57,294
August	81,839	80,650	61,995
September	83,137	81,482	65,797
October		86,569	67,486
November		87,985	66,637
December		89,590	65,558

The production of ferro in September was 15,463 tons, compared with 10,944 in August, a gain of 4,519 tons. Spiegel production in September was 11,619 tons, against 9,736 tons in August, a gain of 1,883 tons.

The month was marked by the blowing in on Sept. 10 of the new "D" furnace of the Youngstown Sheet & Tube Co., Youngstown, O., making the third new steel works furnace in two months, to begin making iron, the Pittsburgh Steel Co. having lighted its two Monessen furnaces in August.

Merchant stacks relighted in September were: Iroquois No. 2, Iroquois Iron Co., Sept. 26; one Wellston, Wellston Steel & Iron Co., Sept. 15, and Alleghany, Alleghany Ore & Iron Co., Sept. 24. Those blown out were: Rebecca, Kittanning Iron & Steel Mfg. Co., Sept. 9; one Saucon, Thomas Iron Co.; Buena Vista, Alleghany Ore & Iron Co., Sept. 24, and Pulaski, Pulaski Iron Co., Sept. 7, for relining.

The steel furnaces blown in last month were: Madeline No. 2, Inland Steel Co., Sept. 25; Youngstown "D", Youngstown Sheet & Tube Co.; one Donora, American Steel & Wire Co., and one Clairton, Carnegie Steel Co. Those blown out were: Minnequa "A", Colorado Fuel & Iron Co., Sept. 20; one Ohio, Carnegie Steel Co., Sept. 12; Mattie, Girard Iron Co., Sept. 22; Hall, Republic Iron & Steel Co., Sept. 29, and Riverside No. 2, National Tube Co., Sept. 4, for relining.

South Works No. 10 and Joliet No. 2, of the Illinois Steel Co., were blown out Oct. 1, while the Punxsutawney stack of the Punxsutawney Furnace Co., was scheduled to go out this week for relining.

Directors of the Waynesboro Metal & Foundry Co., Waynesboro, Pa., have made plans for doubling output. Charles M. Tritsch, Hagerstown, Md., has bought the interest of Frederick D. Miller and succeeds him as president and general manager.

The A. P. Smith Mfg. Co., East Orange, N. J., advises its new building is an extension of its machine shop for which equipment already has been bought.

SEPTEMBER PIG IRON

States.	No. of stacks.	No. in blast last day of month. Sept.	Aug.	Total tonnage made. Merchant.	Non-Merchant.	Totals— Sept.	Aug.
Pennsylvania	159	105	106	163,902	853,604	1,017,506	1,026,737
Ohio	73	60	60	191,710	426,114	617,824	628,567
Alabama	45	21	21	95,786	61,463	157,249	163,266
Virginia	22	5	6	16,985	.....	16,985	25,488
New York	27	18	18	74,988	105,539	180,527	182,297
New Jersey	7	2	2	10,760	.....	10,760	10,981
Illinois	26	19	18	25,440	196,781	222,221	227,395
Colorado	6	2	3				
Indiana	10	10	9				
Maryland	4	3	3				
Wisconsin	6	2	2	12,002	170,640	182,642	184,887
Kentucky	7	2	2				
West Virginia	4	2	3				
Tennessee	18	3	3				
Washington	1	0	0	21,481	14,741	36,222	45,477
Georgia	2	0	0				
Texas	3	0	0				
Minnesota	1	1	1				
Michigan	3	3	3				
Missouri	1	0	0	25,080	.....	25,080	21,243
Spiegel—All states						11,619	9,736
Ferro—All states						15,463	10,944
Totals	425	258	260	638,134	1,828,882	2,494,098	2,537,018

POOR PROSPECT

For Shipbuilding on Lakes—Annual Meeting of American Company.

The annual meeting of the American Shipbuilding Co. was held at Jersey City, on Wednesday, Oct. 8. J. C. Wallace, president of the company, submitted the annual report for the fiscal year ending June 30 last.

During the fiscal year, the company built and completed 14 vessels of 50,800 tons carrying capacity on 19 feet draught. It had under construction at the beginning of the fiscal year 12 vessels. Prospects for the coming year are not good for new construction, as it has been demonstrated that with the increased depth of water and the rapidity that is obtained in loading and unloading from the installation of new and modern plants at the loading and unloading ports, the present tonnage on the lakes is ample although it is believed that a large amount of reconstruction work will have to be done during the coming winter on the smaller and older vessels to enable them to take full advantage of the changes in methods of loading and unloading cargoes.

The financial statement shows that the earnings for the year before deducting maintenance and depreciation amounted to $849,873.89. Deducting $243,399.68 for maintenance and $553,000 for dividends on preferred stock, the sum of $53,474.21 was added to surplus, making the total surplus as of June 30, 1913, $6,561,366.55.

Colgate & Co., New York City, advise that the addition to be erected at its works in Jersey City, N. J., is for a boiler plant and the equipment has been bought.

RATES OF THE NEW TARIFF LAW

Article: Schedule C.—Metals and manufactures of.	Rate of duty: House bill, per cent.	Senate amendment, per cent.	Underwood law per cent.	Payne law, per cent.	
Iron in pigs, spiegeleisen, wrought and cast scrap iron and scrap steel	8	Free	Free	*16.35 † 9.36	§12.71
Ferro-manganese	15	Free	Free	6.74	
Iron in slabs, blooms, etc.	8	Free	Free	17.79	
Muck bars, bar iron, etc.	8	5	5	11.94	
Structural shapes of iron or steel	12	10	10	23.20	
Boiler or other plate iron or steel, sheets of iron or steel, common or black, crucible plate steel and saw plates and skelp iron or steel	15	12	12	37.38	
Anchors and forgings	15	12	12	**31.91	‡30.00
Hoop, band, or scroll iron or steel	12	10	10	20.13	
Iron or steel plates, strips, etc., galvanized, etc.	20	15	15	36.90	
Tin plates, coated, etc.	20	15	15	26.74	
Steel ingots, cogged ingots, etc., made by the Bessemer or similar process	10	Free	Free	21.98	
Steel bars and shapes, made by the Bessemer or similar process	10	8	8	20.00	
Steel ingots, etc., made by the crucible, electric, or cementation process	15	12	15	21.98	
Steel wool or steel shavings	20	15	20	40.00	
Grit, shot, and sand	30	25	30	71.92	
Round iron or steel wire	20	15	15	38.03	
Wire rope	30	25	30	49.84	
Woven-wire cloth, etc.	20	30	15	35.00	
Manufactures of wire	15	25	15	40.57	
Automobiles, valued at—					
Less than $2,000 and more than $1,000	45	30	30	45.00	
$1,000 or less	45	15	30	45.00	
Motor cycles	40	25	25	45.00	
Nuts, or nut blanks, and washers	15	5	5	6.00	
Bolts of iron or steel	15	10	10	20.59	
Spiral nut locks and washers	35	25	30	.....	
Card clothing, when manufactured—					
With round iron or untempered round steel wire	40	10	10	***56.21	
With tempered round steel wire, or plated wire, etc.	40	30	35	.....	
Cast iron pipe, etc.	12	Free	10	17.62	
Sprocket and machine chains	20	25	25	46.59	
Files, file blanks, rasps, and floats of all cuts and kinds	25	20	25	.....	
Hand cut files and files of precision	25	35	25	***60.47	
Needles, etc.	25	20	20	40.19	
Wheels for railway purposes	25	15	20	48.29	
Ingots, cogged ingots, etc.	10	Free	Free	21.98	
		c. lb.	c. lb.	c. lb.	
Aluminum, aluminum scrap, etc.	25	2	2	7	
Aluminum in plates, etc.	25	3½	3½	3	25.00
	p. ct.	p. ct.	p. ct.	p. ct.	
Antimony ore and stibnite, etc.	10	Free	Free	30.65	
		c. lb.			
Bronze powder, etc.	25	8	25	41.88	
Bronze or Dutch metal or aluminum, in leaf	25	4	25	54.02	
		Per cent			
Tinsel wire, lame or lahn	10	6	6	10.59	
Iron ore	Free	Free	Free	15c ton	
	c. lb.	c. lb.	c. lb.	c. lb.	
Lead-bearing ores	⅛	⅛	⅛	1½	
	p. ct.	p. ct.	p. ct.	p. ct.	
Zinc-bearing ores	10	12½	10	46.44	
Zinc in blocks, etc.	10	15	15	23.69	
Articles in chief value of iron, steel, lead, etc.	25	20	20	45.00	

*Pig iron. §Spiegeleisen. †Scrap.
**Anchors. ‡Forgings.
***General equivalent.

McKINNEY TELLS

About the New Cleveland Plant—May Resort to Duplex Process.

New York, Oct. 7.—Price McKinney, of Corrigan, McKinney & Co., Cleveland, was called to the witness stand today to testify for the defense in the suit of the government for the dissolution of the United States Steel Corporation. Under questioning by David A. Reed, of counsel for the defense, he told about the new blast furnaces and steel works which his company is building in the Cuyahoga valley at Cleveland. This plant, he said, is to comprise two 500-ton blast furnaces, on one side of the river, and a steel works on the other side, the two to be connected with a bascule bridge for the transportation of hot metal.

Mr. McKinney objected to stating the cost of the new plant, but he said it is being met by his company without the flotation of bond issues or other outside aid. The steel plant, he said, will have an output of 450,000 tons yearly. It is to contain eight open-hearth furnaces, while space will be set aside for the erection of six additional furnaces, either open-hearth or Bessemer converters, since it may be decided later on to employ the duplexing process of steel-making. For the new blast furnaces approximately 600,000 to 800,000 tons of ore will be required yearly. Thus the requirements of Corrigan, McKinney & Co., taking into account their present blast furnaces, will be roughly 1,500,000 tons of ore a year.

Mr. McKinney stated that his company had no connection with the Steel Corporation. Corrigan, McKinney & Co., he said, control by lease a number of ore properties on the Lake Superior ranges, but a number of these, owing to the lack of demand for ore, are not being operated.

"Then in building this new steel plant you have no fear of being able to obtain sufficient ore?" asked Mr. Reed.

"Of course, if we did not control our own ore supplies, we would not make such a large investment as this steel plant represents," said Mr. McKinney.

The witness was asked whether his company would now be able to contract with an outside concern to furnish ore over a period of 10 years. To this Mr. McKinney answered in the affirmative, saying that his company, in addition to taking care of its own requirements in the future, could agree to furnish 1,500,000 tons of ore a year for a period of 10 years.

IRON AND STEEL PRICES

Pig Iron

PITTSBURGH

(Through This Year.)

Bessemer	$16.65
Basic	14.90 to 15.15
No. 2 foundry	14.90 to 15.15
Malleable	15.15 to 15.40
Gray forge	14.40

(The freight from valley points is 90c.)

CLEVELAND

(Through This Year Delivered in City.)

No. 1 foundry	$15.00 to 15.50
No. 2 foundry	14.75 to 15.00
No. 2 southern	15.10 to 15.35
Bessemer	16.65
Silveries 8 per cent silicon	18.55 to 19.05

CINCINNATI

(Fourth and First Quarters.)

Southern foundry No. 1	$14.75 to 15.25
Southern foundry No. 2	14.25 to 14.75
Southern foundry No. 3	13.75 to 14.25
Southern foundry No. 4	13.50 to 14.00
Southern gray forge	13.25 to 13.75
Mottled	13.25 to 13.50
Southern No. 1 soft	15.25
Southern No. 2 soft	14.75
Standard southern car wheels	27.25 to 27.75
Southern Ohio No. 2	15.20
Southern Ohio No. 3	14.70
Southern Ohio No. 4	14.45
Silveries 8 per cent silicon	18.20 to 18.70

(Freight from Ironton, $1.20; from Birmingham, $3.25.)

CHICAGO

(Delivered Chicago, this year, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnace.)

Lake Superior char., No. 1 to 4	$15.75
Northern foundry No. 2	15.00
Southern foundry No. 2	15.85
Jackson co. silveries, 8 per cent	19.40
South'n silveries, 5 per cent sil.	17.35
Alabama basic	15.85
Malleable	15.00

PHILADELPHIA

(Prompt and third quarter shipment delivered to consumers' plants, in Philadelphia and vicinity, unless otherwise specified.)

Northern No. 1X foundry	$16.25 to 16.50
Northern No. 2X foundry	15.75 to 16.25
Northern No. 2 plain	15.50 to 15.75
Standard forge (Eastern Pa.)	15.00 to 15.25
Virginia No. 2X	15.80 to 16.05
Southern No. 2	15.00 to 15.50
Standard low phos., Phila.	23.00 to 23.50
Lebanon low phos., furnace	17.50 to 18.00
Malleable	16.75 to 17.00
Basic (Eastern and Central Pa.)	15.25 to 15.75

NEW YORK

(Prompt and third quarter delivery, prices based at Jersey City and tidewater.)

Northern No. 1X foundry	$16.25 to 16.50
Northern No. 2X foundry	15.75 to 16.25
Northern No. 2 plain	15.50 to 15.75
Virginia No. 2X	16.10 to 16.35
Southern No. 2	15.25 to 15.75
Malleable	15.75 to 16.00
Gray forge	14.75 to 15.00

ST. LOUIS

(Throughout This Year.)

Southern No. 1	$15.75 to 16.25
Southern No. 2	15.25 to 15.75
Southern No. 3	14.75 to 15.25
Southern No. 4	14.25 to 14.75

(Freight, Birmingham to St. Louis, $3.75.)

BIRMINGHAM

(For southern delivery.)

No. 1 foundry	$12.00 to 12.50
No. 2 foundry	11.50 to 12.00
No. 3 foundry	11.25 to 11.75
No. 4 foundry	11.00 to 11.50
Gray forge	11.00 to 11.50
Mottled	10.25
Standard basic	11.50
Off basic	11.00
Charcoal	25.00

BUFFALO

(Through this year, delivered in city.)

No. 1 foundry	$14.25 to 15.00
No. 2X foundry	14.00 to 14.50
No. 2 plain	14.00
No. 3 foundry	13.75 to 14.00
Gray forge	13.75
Malleable	14.00 to 14.50
Basic	14.50 to 14.75
Charcoal	15.50 to 16.50
Charcoal (special brands)	17.00 to 19.50

Ferro Alloys

English and German 80 per cent ferro-manganese, prompt and forward delivery, $50, seaboard.

Fifty per cent ferro-silicon on contracts, $75, Pittsburgh, or Philadelphia, for carloads; $74 for larger lots and $73 for 600 tons or more. Twelve to 13 per cent, $24. Eleven to 12 per cent, $23. Ten to 11 per cent, $22. Nine to 10 per cent, $21 f. o. b. Globe, Jisco and Ashland furnace. Freight to Pittsburgh, $1.90.

Ferro-carbon titanium 8 cents per pound for carload lots; 10 cents per pound for 2,000-pound lots and over; 12½ cents per pound in lots up to 2,000 pounds.

Freight rates on ferro-manganese, foreign spiegeleisen and electrolytic ferro-silicon from Baltimore to Pittsburgh, $2.16; to Youngstown, $2.48; to Cleveland, $2.57; to Detroit and Columbus, $2.99; to Cincinnati, $3.40; to Chicago and Milwaukee, $4.00. Freights from Philadelphia and New York, 10 to 30 cents higher, respectively.

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds, to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
Denver	84½ cents
St. Louis	22½ cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, shapes and plates	80 cents

Coke

AT THE OVENS.

	Prompt shipment.	Contract.
Connellsville district:		
Foundry coke	$2.85 to 3.10	$2.85 to 3.10
Furnace coke	2.15 to 2.25	2.15 to 2.25
Wise county district:—		
Foundry coke	$2.75 to 3.50	$2.75 to 3.50
Furnace coke	2.25 to 2.50	2.35 to 2.50
Pocahontas district:—		
Foundry coke	$3.00	$3.00
Furnace coke	2.25 to 2.50	2.60 to 2.75
New River district:—		
Foundry coke	$3.25 to 3.50	$3.25 to 3.50
Furnace coke	2.60 to 2.75	2.60 to 2.90

Iron Ore

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, prices are: Old range Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer, $3.40; all at lower lake ports.

Foreign iron ores, 7½ to 8 cents per unit, f. o. b. cars eastern seaboard. Freight rates from Philadelphia to eastern Pennsylvania furnace points range from 35 to 75 cents per ton.

Semi-Finished Material

PITTSBURGH

Bessemer 4 x 4 billets with 0.25 carbon and less, $23.00 to $23.50; open-hearth rolling billets, $23.00 to $23.50; Bessemer sheet bars, $24.00 to $24.50; open-hearth sheet bars, $24.00 to $24.50 f. o. b. Pittsburgh and Youngstown. Forging billets, $30, Pittsburgh. Wire rods, $27.00; muck bar, $30, Pittsburgh.

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity; 4 x 4-inch open-hearth and Bessemer rolling billets at $25 to $26, and forging billets at from $30 to $31; muck bar, $28 to $30.

Standard Shapes

PITTSBURGH

Standard structural shapes, 1.40c to 1.45c. For extras see card of Sept. 1, 1909.

CHICAGO

Standard structural shapes, 15 inch and under, 1.58c to 1.63c.

PHILADELPHIA

Delivered to consumers in Pittsburgh and vicinity. Standard structural shapes 1.50c to 1.55c.

NEW YORK

Standard structural shapes delivered at New York, 1.51c to 1.56c.

Plates

PITTSBURGH

Standard steel plates ¼ inch thick, 6¾ to 100 inches, 1.35c to 1.40c. For extras, see card of Sept. 1, 1909.

CHICAGO

Tank plates, 1¼ inches thick, 6⅝ to 100 inches wide, 1.58c to 1.63c.

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: Tank plates for prompt or forward delivery at Philadelphia and vicinity, 1.50c to 1.55c.

NEW YORK

Steel plates, tank quality, for prompt and forward delivery at New York, 1.51c to 1.56c.

Sheets and Tin Plate

PITTSBURGH

No. 28 black	2.05c to 2.15c
No. 30 tin mill black	2.10c to 2.20c
No. 28 galvanized	3.10c to 3.20c
No. 10 blue annealed	1.60c to 1.65c
No. 28 painted, corrugated	2.20c to 2.30c
No. 28 galvanized, corrugated	3.10c to 3.20c
Tin plate, 100-pound cokes	3.50c to 3.60c

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: No. 10 gage annealed sheets at 1.80c.

Pipe and Boiler Tubes

PITTSBURGH

	Black Butt.	Galv. Weld.
Steel, ¾ to 3 inches	80	71½
Iron, ¾ to 2½ inches	70	61
BOILER TUBES		
Steel, 3½ to 4½ inches	69	..
Iron, 3½ to 4½ inches	58	..

Other sizes of pipe and tubes take the usual advances as per official cards.

Rails and Track Material

PITTSBURGH

Steel rails, 50-pound and heavier, 1.25c per pound for Bessemer and 1.35c for open-hearth, carload lots; less than 500 tons 1.35c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, base, Pittsburgh; track bolts, 2.40c base, Pittsburgh.

Railroad spikes, 4½, 5 and 5½ and 9-16 inch, 1.65c.

CHICAGO

Light rails, carloads, 25 to 45-pound, 1.25c, base; 16 to 20-pound, 1.30c; 12-pound, 1.35c; 8-pound, 1.40c.

Light section relayers, 45 pounds and under, subject to inspection, $21.50 to $22.50; standard section relaying rails, subject to inspection, $23 to $24.

Track fastenings, f. o. b. Joliet:

Angle bars, 1.50c; railroad spikes, 1.70c; smaller size spikes, 1.85c base; track bolts with square nuts, 2.20c to 2.25c.

Bars, Hoops and Bands

PITTSBURGH

Common iron bars, 1.50c to 1.55c, Pittsburgh; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator, 1.40c; channels, angles, zees, tees, under 3 inch, 1.50c, all f. o. b. mill.

Hoops in carload lots, 1.60c, Pittsburgh; in less than carload lots, 1.65c; bands, 1.40c, base, with net extras as per standard steel.

Cold rolled and ground shafting, 60 to 62 per cent off in carloads and 55 to 57 per cent in less than carloads delivered in base territory.

CHICAGO

Bar iron, 1.25c to 1.35c, hard steel bars rerolled, 1.45c; soft steel bars, bands and small shapes, 1.58c; hoops, 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting, 58 per cent off list for carload lots, 53 per cent off for less than carloads.

PHILADELPHIA

Delivered in consumers' plants in Philadelphia and vicinity: Steel bars, 1.55c to 1.60c on contract and common bar iron, 1.32½c to 1.42½c. Cut nails 1.90c to 1.95c. Philadelphia. Shafting 62 and 60 off in carloads and 57 and 55 off in less than carloads in base territory.

NEW YORK

Delivered in New York steel bars on contract from 1.56c to 1.61c, and common iron bars, 1.33c to 1.45c.

Bolts, Nuts and Rivets

Rivets

Button head structural rivets, 1.90c to 2.00s, Pittsburgh, cone head boiler rivets, 2.00c to 2.10c. Small rivets, 75, 10 and 10 off.

Structural rivets, Chicago, 1.95c to 2.00c; boiler rivets, 0.10c extra.

Bolt and Nut Discounts

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, small and shorter, rolled threads, 75 and 10; cut threads, 75 and 5; larger and longer, 70 and 2½.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller and shorter, rolled 75, 10 and 5; cut, 75 and 10; larger and longer, 70 and 7½.

Gimlet and cone point lag or coach screws, 80 and 10.

Hot pressed square, blank or tapped nuts, $5.70 off list; hot pressed hexagon blank or tapped, $6.30.

Cold pressed C. & T. square, blank or tapped, $5.70 off; hexagon, blank or tapped, ⅝-inch and larger, $6.65 off; ½-inch and smaller, $7.20 off.

Wire Products

PITTSBURGH

Wire nails, jobbers' carload lots, $1.65; retailers' carload lots, $1.70; cut nails (western makers), jobbers' lot, $1.65; painted barb wire, jobbers' carload lots, $1.65; retailers' carload lots, $1.70; plain wire to jobbers in carloads, $1.45; and to dealers in carloads, $1.50; polished staples, $1.65; galvanized staples, $2.05.

CHICAGO

Wire nails, jobbers' carload lots, $1.83; retailers' carload lots, $1.88; retailers' less than carload lots, $1.93; painted barb wire, jobbers' carload lots, $1.83; retailers' carload lots, $1.88; retailers' less than carload lots, $1.93; with 40c for galvanizing; plain wire, jobbers' carload lots, $1.63; retailers' carload lots, $1.68.

Cast Iron Pipe

CHICAGO

Four-inch water pipe, $27; ½ to 12 inches, $26; larger sizes, $24; gas pipe, $1 a ton higher.

NEW YORK

Six-inch pipe, 30 pounds to the foot, $23 to $24, f. o. b. New York, in carload lots.

BIRMINGHAM

Water mains: 4-inch, $22.00; 6 to 8-inch, $20.50; larger sizes, $20. Gas main: $1 per ton higher than water mains. Special fittings, $47.50 to $52.50.

Old Material

PITTSBURGH

(Gross Tons Delivered.)

Heavy melting scrap	$12.50 to 12.75
Rerolling rails	14.00 to 14.50
Malleable	12.00 to 12.25
Bundled sheet scrap	8.00 to 8.25
Iron axles	24.50 to 25.00
Old iron rails	14.50 to 15.00
Stove plate	9.00 to 9.25
No. 1 wrought scrap	13.00 to 13.50
Old car wheels	12.75 to 13.00
Low phosphorus	15.00 to 15.50
Machine shop turnings	7.00 to 7.25
No. 1 busheling	11.00 to 11.50
Cast borings	8.00 to 8.25
No. 1 cast scrap	12.25 to 12.75

PHILADELPHIA

Gross tons delivered to consumers' plants, in eastern Pennsylvania and western New Jersey:

Old iron rails (nominal)	$17.00 to 17.50
Old steel rails (rerolling)	15.00 to 15.50
No. 1 heavy melting steel	11.25 to 11.50
Old car wheels	12.50 to 13.00
Old iron axles	25.00 to 26.00
Old steel axles	18.00 to 18.50
No. 1 railroad wrought	14.00 to 14.50
Wrought pipe	11.00 to 11.50
Cast borings	8.00 to 8.25
Machine shop turnings	8.00 to 8.50
Heavy cast (broken)	13.00 to 13.50
Malleable	11.50 to 12.00
Stove plate	10.50 to 11.00
No. 1 forge	10.00 to 10.50
Low phosphorus	15.00 to 15.50

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg, and Steelton, Pa.; $1.40 to Milton, Pa.

CLEVELAND

Gross Tons

Old iron rails	$15.00
Old steel rails (under 3 ft.)	13.00 to 13.50
Old steel rails (over 6 ft.)	13.50 to 14.00
Relaying rails	23.00 to 25.00
Old steel boiler plate	9.00 to 9.50
Malleable iron (railroad)	11.75 to 12.00
Axle turnings	7.50 to 8.00
Steel axles	18.00 to 19.00
Malleable iron (agricultural)	9.00 to 9.50
Heavy steel	10.25 to 10.75
Country mixed steel	8.50 to 9.00
Bundled sheet scrap	7.00 to 7.50

Net Tons

No. 1 R. R. wrought	$11.00 to 11.50
No. 1 busheling	9.00 to 9.50
No. 1 machine cast	11.00 to 11.50
No. 1 dealers' wrought	8.50 to 9.00
Machine shop turnings	4.00 to 4.50
Pipes and flues	7.50 to 8.00
Wrought drillings	4.00 to 4.50
Cast borings	5.75 to 6.00
Stove plate	8.25 to 8.50
Wrought iron arch bars	16.00
Wrought iron piling plate	14.00

CHICAGO

(Delivered in consumers' yards.)

Gross Tons

Old car wheels	$13.00 to 13.50
Old iron rails	13.75 to 14.25
Rerolling rails (5 ft. and over)	12.00 to 12.50
Old steel rails (3 ft. and und.)	11.25 to 11.75
Frogs, switches and guards	10.50 to 11.00
Heavy melting steel	10.50 to 11.00
Shoveling steel	10.00 to 10.50

Net Tons

No. 1 R. R. wrought	$ 9.75 to 10.25
No. 2 R. R. wrought	8.75 to 9.25
Arch bars and transoms	13.25 to 13.75
Knuckles, couplers and springs	10.75 to 11.25
Shafting	14.25 to 14.75
Iron car axles	20.25 to 20.75
Steel car axles	14.50 to 15.00
Locomotive tires	12.00 to 12.50
Dealers' forge	8.50 to 9.00
Pipe and flues	7.50 to 8.00
No. 1 cast	10.75 to 11.25
No. 1 busheling	8.50 to 9.00
No. 2 busheling	6.50 to 7.00
No. 1 boiler cut	8.25 to 8.75
Boiler punchings	12.00 to 12.50
Cast and mixed borings	5.25 to 5.75
Machine shop turnings	4.50 to 5.00
Railroad malleable	10.75 to 11.25
Agricultural malleable	10.00 to 10.50
Angle bars, splices, etc., iron	13.00 to 13.50
Angle bars, steel	9.00 to 9.50
Stove plate and light cast scrap	8.75 to 9.25

NEW YORK

Gross tons, New York dealers' prices at tidewater, usually for eastern Pennsylvania delivery:

Old car wheels (nominal)	$10.50 to 11.00
Heavy steel axles	15.25 to 15.50
Steel shafting	14.50 to 15.00
No. 1 heavy melting steel	9.50 to 9.70
No. 1 R. R. wrought	12.00 to 12.25
Wrought pipe (not galvanized)	9.00 to 9.25
Cast borings	6.00 to 6.50
Machine shop turnings (nominal)	5.50 to 6.00
Heavy cast	11.25 to 11.50

Stove plate	8.00 to 8.50
Grate bars	6.25 to 6.50

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., $1.50; from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York.

CINCINNATI

Gross Tons

Old iron rails	$11.00 to 11.50
Old steel re-rolling	9.50 to 10.00
Old iron axles	15.50 to 16.00
Heavy melting scrap	8.50 to 9.00
Relaying rails	18.50 to 19.00

Net Tons

Old No. 1 R. R. wrought	$8.50 to 9.00
Bundled sheet scrap	4.50 to 5.00
No. 1 yard wrought	6.50 to 7.00
No. 1 machine cast	9.00 to 9.50
No. 1 busheling	6.50 to 7.00
Stove plate	6.25 to 6.75
Machine shop turnings	4.50 to 5.00
Cast borings	4.00 to 5.00
Heavy turnings	5.00 to 5.50
Mixed cast	7.50 to 8.00
Breakage	5.00 to 6.00
Malleable	6.50 to 7.00

BIRMINGHAM

Old iron axles (light)	$15.00 to 15.50
Old steel axles (light)	15.00 to 15.50
Old iron rails	12.50 to 13.50
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.00 to 10.50
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	8.50 to 9.00
No. 1 machinery cast	10.50 to 11.00
No. 1 steel scrap	10.50 to 11.00
Standard car wheels	12.00 to 12.50
Tram car wheels	10.50 to 11.00
Light cast and stove plate	9.00 to 9.50

BUFFALO

Gross Tons

Heavy melting steel	$10.50 to 11.00
No. 1 R. R. wrought scrap	13.00 to 13.50
No. 1 R. R. and mch. cast scrap	13.00 to 13.50
Old steel axles	17.00 to 17.50
Old iron axles	22.50 to 23.00
Car wheels	12.50 to 13.00
Railroad malleable scrap	12.00 to 12.50
Machine turnings	6.00 to 6.50
Heavy axle turnings	8.00 to 8.75
Cast iron borings	6.25 to 6.75
Low phos. steel scrap	16.50 to 17.00
Old iron rails	15.00 to 15.50
Boiler plate, sheared	12.50 to 13.25
Bundled sheet scrap	8.00 to 8.50
Stove plate (net ton)	9.75 to 10.00
Locomotive grate bars	10.00 to 10.50
No. 1 busheling scrap	10.50 to 11.00
No. 2 busheling scrap	8.00 to 8.50
Wrought pipe	9.50 to 10.00

ST. LOUIS

(Dealers' buying prices.)

Gross Tons

Old car wheels	$11.25 to 11.75
Old iron rails	12.00 to 12.50
Re-rolling rails (5 ft. and over)	11.50 to 12.00
Old steel rails (3 ft. and und.)	10.00 to 10.50
Light sec. relayers (45 pounds and und.) subject to inspec.	24.00 to 24.50
Relaying rails, subject to inspec.	24.00 to 24.50
Frogs, switches and guards	9.50 to 10.00
Shoveling steel	9.00 to 9.50

Net Tons

No. 1 railroad wrought	$10.00 to $10.50
No. 2 railroad wrought	9.50 to 10.00
Arch bars and transoms	13.00 to 13.50
Knuckles, couplers, springs	9.00 to 9.50
Shafting	13.50 to 14.00
Steel car axles	15.00 to 15.50
Iron car axles	18.00 to 18.50
Locomotive tires	11.00 to 11.50
Pipe and flues	7.00 to 7.50
Tank iron and cut boilers	7.00 to 7.50
No. 1 cut busheling	9.00 to 9.50
Cast iron borings	4.00 to 4.50
Machine shop turnings	5.00 to 5.50
Railroad malleable	8.50 to 9.00
Agricultural, malleable	7.00 to 7.50
Stove plates	8.00 to 8.50
Angle splice bars (iron)	11.00 to 11.50
Angle splice bars (steel)	9.00 to 9.50

Store Prices

CINCINNATI

Steel bars, 1.95c to 2c; iron bars, 1.85c to 1.90c; plates and shapes, 2.05c to 2.10c; sheets, blue annealed No. 10, 2.15c to 2.20c, black, No. 28, 2.65c; galvanized, No. 28, 3.75c; cold rolled shafting, round, square, hexagon and flat, 53c off.

CLEVELAND

Steel bars, 2.00c; plates and shapes, 2.10c; iron bars, 2.00c; sheets, No. 16 blue annealed, 2.40c; No. 28 black, 2.85c; No. 28 galvanized, 3.95c.

CHICAGO

Steel bars, 1.85c; iron bars, 1.85c; hoops, 2.50c; shapes and plates, 1.95c; No. 10 blue annealed sheets, 2.15c, black, No. 28, 2.75c; galvanized, No. 28, 4.00c.

PHILADELPHIA

Steel bars, 2.00c to 2.05c structural shapes, 2.00c to 2.10c; plates, 2.00c to 2.10c.

NEW YORK

Steel bars, 2.00c; structural shapes, 2.05c; plates, 2.05c.

Death of Henry B. Lupton

Pittsburgh, Oct. 8. (By wire.)—Henry B. Lupton, vice president of the Oliver Iron & Steel Co., Pittsburgh, died at his home in this city Tuesday afternoon. He was born in Cincinnati, Dec. 23, 1849. Mr. Lupton was one of the best known men in the iron and steel trade in the Pittsburgh district.

Mill for New South Wales

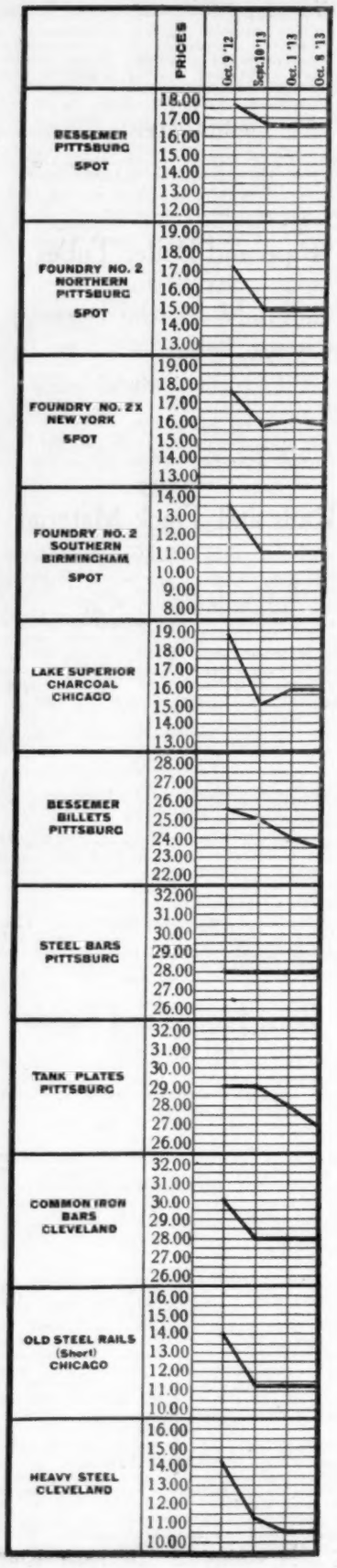
Pittsburgh, Oct. 8. (By wire.)—The Riter-Conley Mfg. Co. has received a contract from the Broken Hill Proprietary Co., Ltd., Newcastle, New South Wales, for an open-hearth mill building, 74 x 675 feet, and an engine house, 50 x 425 feet, and four smaller mill buildings, involving 3,000 tons.

The Davis Mfg. Co., Milwaukee, advises it plans a new building, but has not decided whether to start construction this fall or await the coming of spring. No action has been taken on machinery requirements or other equipment.

The plant of the Superior Foundry Co., Cleveland, has been completed and is in operation. There are two buildings, the foundry, 100 x 700 feet, and the pattern shop 50 x 200 feet. Brick, steel and concrete were used.

The Lunkenheimer Co., Cincinnati, advises plans are in the hands of its architects for a new iron foundry but definite decision as to building will not be reached before next spring.

PRICE CHART



Benzol—How it is Recovered from Coal Gas

(*Continued from page 632.*)

is about 60 per cent. By distilling 10,000 gallons of washed crude toluol in order to recover pure toluol the distillation takes the course of the curve shown in Fig. 12. The distillation begins at *A*, evaporating benzol, and then a mixture of benzol and toluol up to point *B*. From *B* to *C* pure toluol is distilled. After this the distillation follows the curve from *C* to *D* in distilling a mixture of toluol and xylol. By producing pure xylol there would be a similar curve. As shown in Figs. 11 and 12, the lines from *B* to *C* for pure benzol and pure toluol show a slight increase in temperature, amounting to 1.1 degrees Fahr. for benzol and 1.8 degrees for toluol. Therefore, it is apparent that even the products termed pure are not absolutely chemically pure, otherwise the curves would not rise. The mixtures from *A* to *B* and from *C* to *D* are added to the purified products and are sold together with them. Naturally it would be possible to collect large amounts of these mixtures and to redistill them in order to again secure certain quantities of pure products, but there is no advantage in doing this because the market demands chiefly purified products.

The operation of a benzol plant is simple, requiring no expert knowledge and few chemical tests have to be made.

Death of T. Frame Thomson

A cablegram announces that T. Frame Thomson, chairman of the board of directors of the Otis Steel Co., Cleveland, accidentally shot and killed himself Tuesday, Sept. 30, while unloading a gun at his home near London, Eng.

During the past nine years Mr. Thomson visited Cleveland every year and was closely in touch with all the operations of the Otis Steel Co. His last visit was made in March of this year. He had intended to sail for Buenos Aires, Sept. 26, but for some reason evidently was detained in London. Although only 46 years old, his success had been great.

Mr. Thompson was born at Dowanside, Glasgow, May 19, 1867. His father was Dr. Thomson, who at one time was a medical missionary on the west coast of Africa, and later was a practicing physician in Liverpool. His mother was the eldest daughter of Thomas Frame, a prominent merchant of Glasgow. His father and mother both died when he was about six years of age.

He attended boarding school in Scotland until the age of 16, when he became a pupil to the firm of Strain & Robertson, civil engineers, of Glasgow.

At the age of 19, he entered technical school, from which he graduated as a civil engineer, and then became a partner in the firm, under the style of Strain, Robertson & Thomson, which partnership lasted for five years. He was resident engineer on a section of the present Glasgow & South Western railway, built by this firm, and during the last years of his connection with the firm, was its representative in London. He then decided to practice in London as a consulting civil engineer on his own account, but before opening his offices

T. FRAME THOMSON

he made a lengthy visit to the Argentine Republic.

Shortly after settling in London as a consulting civil engineer, he met Theodore N. Vail, who interested him in La Capital Tramway Cie., operating in Buenos Aires. This was the beginning of Mr. Thomson's connection with street railways in South America, which developed until at the time of his death he was deputy chairman of the Anglo-Argentine Tramways Co., Ltd., operating about 350 miles of surface lines in the city of Buenos Aires, and having a capital of $135,000,000. He was a director of the Compagnie Generale de Tramways de Buenos Aires, and chairman of the subway committee of the Compagnie Generale, now building a rapid transit system in Buenos Aires. He was vice chairman of the Cordoba (Argentine) Light, Power & Traction Co., Ltd., and vice chairman of the United Tramways of Montevideo. He was a director of the Alliance Trust Co., Ltd., of London.

In 1906, he became interested in the Otis Steel Co., Ltd., as a director and chairman of the board. When the company became an Ohio corporation, as The Otis Steel Co., in January, 1912, he continued to be a director and chairman of the board. He was a member of the Institute of Civil Engineers, of London, and took great interest in the student members. He endowed a fund to provide for annual lectures to the students on business matters in their connection with engineering.

Mr. Thomson was a member of the Iron and Steel Institute, of Great Britain, the Societe des Ingenieurs Civils de France, and the American Iron and Steel Institute.

In politics he was a Conservative, and was approached a number of times to stand as parliamentary candidate, but would not consent to do so. He leaves a widow (who was Miss Florence McClymot) and four children, the eldest of whom is 12.

September Ore Movement

The movement of Lake Superior iron ore reached 7,258,413 tons in September, a decrease of 28,817 tons from the movement of September, 1912.

The movement to Oct. 1 totals 39,265,484 tons, as against 36,338,382 tons for the corresponding period last year, an increase of 2,927,102 tons. Last year the fleet moved 7,010,219 tons in October and 4,072,674 tons in November and to close of navigation in December, a total of 11,082,893 tons. Should the fleet keep up a corresponding movement for the next two months it will have moved altogether 50,348,377 tons.

Following are the shipments by ports during September and to Oct. 1, with corresponding data for last year:

Port.	Sept., 1912.	Sept., 1913.
Escanaba	770,974	673 591
Marquette	566,178	418,242
Ashland	757,764	485,174
Superior	2,031,086	2,224,553
Duluth	1,652,735	1,938,823
Two Harbors	1,508,493	1,518,030
	7,287,230	7,258,413
1913 decrease		28,817

Port.	To Oct. 1, 1912.	To Oct. 1, 1913.
Escanaba	4,010,985	4 297,223
Marquette	2,567,578	2,573,604
Ashland	3,623,161	3,558,802
Superior	11,097,276	10,810,391
Duluth	7,729,187	9,830,726
Two Harbors	7,310,195	8,194,738
	36,338,382	39,265,484
1913 increase		2,927,102

FOREIGN MARKETS

BELGIAN IRON TRADE

Brussels, Sept. 18.—The pig iron market here has shown further signs of weakness, and in consequence of continued active foreign competition prices of nearly all sorts have been reduced by 1 franc (19 cents) per ton, foundry iron now being quoted 76 francs ($14.44), Thomas iron 69 francs to 70 francs ($13.11 to $13.30). Luxemburg puddle iron, which at the beginning of August still commanded 68 francs to 69 francs ($12.92 to $13.11) can now be had at 62 francs to 64 francs ($11.78 to $12.16). Half products, on the other hand, have remained relatively steadier. The steel syndicate has left prices for the last three months of the year unchanged.

Bar iron has been less active during the past few weeks than during the earlier half of August. Specifications are, however, coming in regularly. Plate and sheets have been depressed through keen German competition, but latterly they have recovered 1s to 2s (24½ cents to 29 cents). The quotation for plates is £5 7s to £5 8s ($26.04 to $26.29) and sheets ⅛ inch, are offered at £5 10s to £5 12s ($26.77 to $27.26), but business is passing below these figures. Hoop iron is irregular and for export is quoted 2s and 6d (61 cents) lower at £6 5s to £6 10s ($30.43 to $31.64). Small girders are also 2s and 6d (61 cents) easier at £6 7s to £6 12s ($30.91 to $32.13). Wire and wire products have a dragging sale, and prices are unsatisfactory. Rails are tending lower, and the hoped for increase in the demand has not yet been realized.

RUSSIAN IRON TRADE

St. Petersburg, Sept. 17.—There is no slackening in the Russian iron tension. The furnaces are kept busy and the demand keeps fully ahead of the supply. A feature of the industry is the rapid recovery that has been experienced in the wagon building works where in every case as compared with a year back the orders received and the goods being turned out show continual progress. This is particularly satisfactory, as at one period through government laxity in regulating the orders, the wagon building firms were thrown into a state of disorganization. The reports from the provinces as far away as Orenburg show that, stimulated by the building trade, which is very busy, the iron merchants are doing a splendid business, but for a week or two back there has been no change in prices. The Urals iron industry is very busy and shipments south are satisfactory in volume and price. Here, too, a feverish activity has taken the place of such a setback as to have suggested that the Urals iron industry must be called a thing of the past. The factories have recovered their former vitality.

GERMAN IRON TRADE

Berlin, Sept. 18.—The trend of the iron market is persistently downward and there are at present no signs that this movement is coming to a standstill. Calls of pig iron are irregular, and there is a feeling of suspense as the price policy of the syndicate is largely dependent upon coke prices, which are to be fixed shortly. The bar iron market is somewat irregular, but, on the whole, moderately satisfactory, especially as regards export. Iron bars are now quoted 140 marks to 145 marks ($32.90 to $34.07½), which is 5 marks ($1.17½) lower than a fortnight ago. Plates and sheets are about 24 marks ($5.64) lower than a year ago and still favor buyers. Wire and wire products are in a similarly unsatisfactory position.

The pig iron production in August was 1,638,800 tons (July, 1,647,700 and August, 1912, 1,487,500).

Catalogs Requested.—Consul Henry D. Baker on special service in India, has made a very interesting report on industrial and commercial progress in the state and city of Baroda. He says that the Baroda department of commerce and industry would like to obtain catalogs and other information from the United States describing tools, machine shop machinery, stamping and metal works, with the view to their introduction into Baroda, if found suitable for conditions there. The library system of Baroda is chiefly used for industrial and commercial study. Contributions of catalogs from American manufacturers are especially invited. These catalogs will be indexed by the card system and it is expected that much use will be made of them.

FRENCH IRON TRADE

Paris, Sept. 18.—The productive capacity of the French iron industry is being largely increased by the extension of existing works and the formation of new companies. The Acieries de Micheville are completely rebuilding their blast furnace plant, the stacks having a daily capacity of 200 tons each. The Forges et Acieries de la Marine et Homecourt are putting down three new furnaces at Homecourt and rebuilding two of those at their Boucau works. The Compagnie des Forges de Chatillon-Commentary et Neuves Maisons are laying down two large furnaces at Neuves Maisons, which will be producing by the end of this year. The Societe Anonyme des Hautfourneaux de la Chiers, Longwy-Bas, has just finished the second of two new 200-ton furnaces. The third new furnace of the Forges et Acieries du Nord et de l'Est, Valenciennes, has now been completed. Of the new undertakings may be mentioned the Hochofen von Caen, the Pont-a-Vendin Works, the Isbergues Co., the Denain-Anzin Co., Escaudin, and the Iron Co., Rouen. The Pont-a-Vendin Works is expected to be producing by 1914, and the Rouen undertaking in 1915.

Pump Company Improvements

The Van Wie Pump Co., Syracuse, N. Y., which recently increased its capital stock, advises that it has made extensive repairs and improvements to its machine shop, foundry and pattern room. It has discarded about 90 per cent of the old machinery and replaced it with new and up-to-date wood and metal-working equipment. The pattern shop has been fitted out entirely with new machinery. These improvements are a part of the general overhauling of the plant in Syracuse, which was inaugurated last spring. The business of the Van Wie Pump Co. was established in 1860, at Baldwinsville, N. Y., and was at that time conducted by White & Clark. Then followed successively the administrations of White, Clark & Co., Clark & Van Wie, Baldwinsville Centrifugal Pump Works and Irvin Van Wie. In 1905, the business was incorporated under New York laws with the name of the Van Wie Pump Co. The business is manufacturing centrifugal pumps, triplex pumps and engines.

Celebration of Founders' Week at Chicago

Programs of the Annual Meetings of the Three Allied Foundrymen's Organizations—Exposition of Foundry Equipment and Supplies and the Exhibitors

Founders' week will be celebrated at Chicago from Oct. 10 to 17, and during this period will be held the annual meetings of the American Foundrymen's Association, American Institute of Metals and the Associated Foundry Foremen, as well as the exposition of foundry supplies and equipment under the auspices of the Foundry & Machine Exhibition Co.

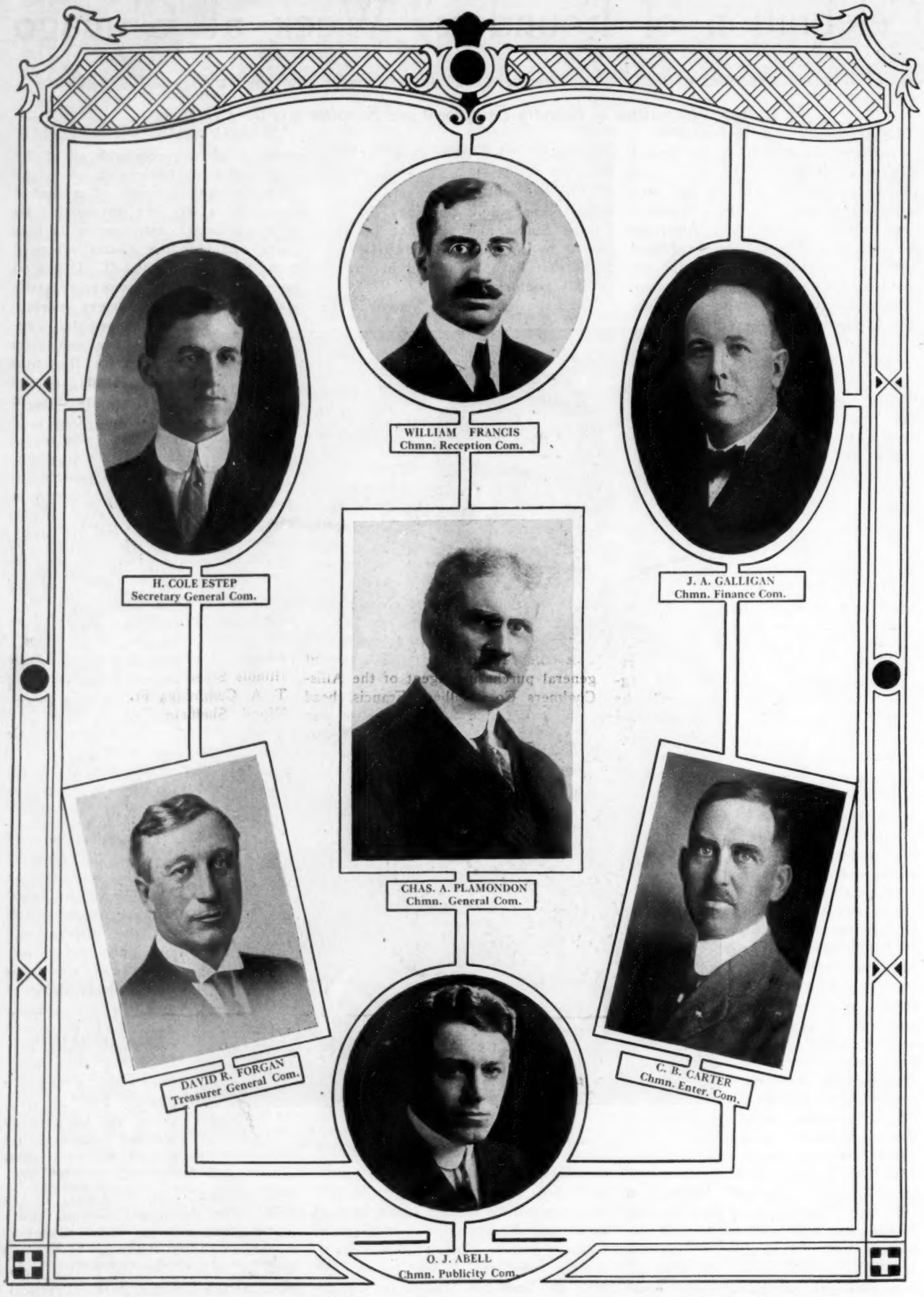
The 12 years intervening since the foundrymen last met in the Windy City, witnessed more growth, change and progress in the foundry industry than almost any preceding period that could be selected. During these years, the great movement toward replacing hand labor with mechanical appliances in every department of casting shops was brought to complete fruition; the old days of rule-of-thumb in foundry operation have passed forever and the era of scientific management—using the phrase in its practical sense—has arrived. The contrast between the Chicago convention of 1901 and the Chicago convention and exhibition of 1913 will form a striking commentary on the rapidity with which industries move forward in the United States. Twelve years ago the convention was held by a single organization; today three great allied foundry associations hold their meetings simultaneously during Founders' Week. In 1901 the idea of having an exhibition of shop equipment in connection with the conventions had not been conceived. In fact, it was five years later, 1906, before the first exhibit under the auspices of the Foundry Supply Association was held in Cleveland. The 1913 show of the Foundry & Machine Exhibition Co. in Chicago will require one of the largest exposition buildings in the United States and will not be surpassed by any of the industrial displays that have been held heretofore in this country.

H. D. MILES,
President, American Foundrymen's Association

The exposition will be housed in the International Amphitheater, Forty-second and Halsted streets, Chicago. This structure is located within 20 minutes' ride from the loop district of Chicago and is reached by the South Side elevated railway and by six surface car lines. It also is readily accessible by automobile, via Forty-third street, which connects with all of the north and south boulevards.

The building consists of a central arena, 100 x 200 feet, surrounded by an amphitheater, together with four wings or exhibition courts arranged in the form of a capital H. It has no basement and is, therefore, specially adapted for exhibiting heavy machinery. Immediately adjoining the exhibition building is the new Stock Yard Inn, a rambling structure of English architecture. It has 175 sleeping rooms and all the appointments of a modern hotel. A combined floor area of over 100,000 square feet is available for the show and early in September over 60,000 square feet had been sold for exhibition purposes. There will be approximately 170 individual exhibits, embracing everything used in any department of the foundry. In brief, the Chicago show will be a living catalog of foundry and shop equipment.

The entire scope of the foundry industry will be reflected on the floor of the International Amphitheater, for the display will not only cover mechanical appliances and supplies designed primarily for foundry use, but practically everything which may be found in a modern metal working plant. For instance, there will be over 40 working exhibits of machine tool companies, this being one of the largest machine tool displays of the year. The signal advances in molding machine practice which have taken place during the past 12 months will be exemplified by working displays at the Chicago show. Practically every size and type of molding ma-



MEMBERS OF THE GENERAL COMMITTEE IN CHARGE OF THE CHICAGO MEETING

chine manufactured in the United States will be available for the inspection of the visiting foundrymen. The exhibits also will illustrate the extensive use of electric and compressed air appliances in modern shops and foundries. In addition, the visitor will learn of many novel methods of handling materials, including the application of magnets, unique types of conveyors, elevators, etc. The problem of sand-handling, which is a serious one in a large shop, will be fully covered. The show also will include many examples of modern pattern shop machinery operating under working conditions.

Conventions of Allied Associations

The exhibition opens on Friday, Oct. 10, and remains open continuously during the day and evening until Saturday, Oct. 18, Sunday, Oct. 12, excepted. It has been suggested that companies which have a large number of men to send to the exposition will take advantage of the opportunity afforded them to have their men attend in relays, thereby obviating interference with shop operations.

The convention of the allied organizations, including the American Foundrymen's Association, the American Institute of Metals and the Associated Foundry Foremen, will be held simultaneously from Tuesday until Thursday, inclusive, Oct. 14 to 16. The registration booths, however, will be open Monday, Oct. 13. Headquarters for the three associations have been established at the La Salle hotel. The professional sessions of the American Foundrymen's Association and the American Institute of Metals will be held simultaneously in the two large banquet rooms on the top floor of the building. The convention will be opened by a joint meeting Tuesday morning, Oct. 14.

The Chicago foundrymen have prepared a simple, dignified and comprehensive program of entertainment. In addition to the recreation features in which everyone who registers at the convention will participate, special arrangements have been made so that the leading foundries, steel plants and other industrial establishments in Chicago and vicinity may be inspected at the convenience of the visitors. A special entertainment program also has been outlined for the many ladies who are expected.

Local Committee

The work of preparing for the convention has been in the hands of an able local committee, headed by Charles A. Plamondon, of the A. Plamondon Mfg. Co. Mr. Plamondon has been connected with the foundry business for many years, and 20 years ago, in 1893, he was the first president of the Western Foundrymen's Association, which was the pioneer foundry organization in the Chicago district. David R. Forgan, treasurer of the local committee, is president of the National City Bank and is also one of the leading financiers of the country. The secretary, H. Cole Estep, is associate editor of THE IRON TRADE REVIEW. The chairman of the finance committee, J. A. Galligan, is head of the coke sales department of Pickands, Brown & Co. Previous to his connection with this concern he was assistant general purchasing agent of the Allis-Chalmers Co. William Francis, head of the reception committee, has also been prominently identified with the foundry business in Chicago for many years. He is now president of the Francis & Nygren Foundry Co. Charles B. Carter, chairman of the entertainment committee, is a special sales representative of the American Brake Shoe & Foundry Co. Mr. Carter began his foundry training on the floor and has worked up through the various departments of the business. O. J. Abell, chairman of the publicity committee, is western editor of *The Iron Age* and previous to his present connection was mining editor of THE IRON TRADE REVIEW. These men constitute the general committee, which has supervisory charge of all the convention arrangements. But a large measure of the credit for the great volume of work handled by the Chicago committee should be given to the many able members of the several sub-committees. The full personnel of the various committees is as follows:

Finance Committee.—J. A. Galligan, Pickands, Brown & Co., chairman; A. N. Hayes, Johnston & Jennings Co.; Geo. W. Pyott, Pyott Foundry Co.; H. N. Wade, U. S. Wind Engine & Pump Co.; David Evans, Chicago Steel Foundry Co., and E. J. Welch, of the E. J. Welch Foundry Co.

Reception Committee.—Wm. Francis, Francis & Nygren Foundry Co., chairman; E. L. Cleveland, Garden City Foundry Co.; H. O. Lange, Ferguson & Lange; G. S. Burtis, Brady Foundry Co.; J. P. O'Neil, Western Foundry Co.; W. B. Greenlee, Greenlee Foundry Co.; L. S. Rice, Allis-Chalmers Mfg. Co.; Thomas Jones, W. A. Jones Foundry Co., and Irvin McDowell, McDowell Foundry Co.

Entertainment Committee. — Charles B. Carter, American Brake Shoe & Foundry Co., chairman; E. F. Axner, Illinois Steel Co.; Thomas Cummings, T. A. Cummings Foundry Co.; James Wood, Sheffield Foundry Co.; C. M. Eddy, R. M. Eddy Foundry Co.; Frank Smith, Hewitt Mfg. Co.; I. E. Burtis, J. A. Brady Foundry Co.; J. G. Garrard, Northwestern Malleable Iron Co., and James E. Evans, of the S. Obermayer Co.

Publicity Committee. — O. J. Abell, *Iron Age*, chairman; H. L. Hanson, David Evans & Co.; A. O. Sonne, Rogers, Brown & Co.; Richmond Nicholas, Hickman, Williams & Co., and Alex. B. Hawes, of Matthew Addy & Co.

Exhibits of Foundry Equipment and Supplies

AJAX METAL CO., Philadelphia.—The various ingot metals manufactured by this company will be displayed, including Ajax plastic bronze, manganese bronze, phosphor bronze, acid bronze, hydraulic bronze, steam metal, red brass Nos. 1 and 2 and yellow brass Nos. 1 and 2, in addition to phosphor copper, manganese copper, silicon copper, Ajax bull babbitt metal and Ajax genuine babbitt metal; represented by H. L. Carpenter, G. H. Clamer, W. J. Coane and C. F. Hopkins.

ALBANY SAND & SUPPLY CO., Albany, N. Y.—A range manufactured by the Walker & Pratt Mfg. Co., Boston, Mass., all of the castings of which were molded in Albany sand, mined and shipped by the Albany Sand & Supply Co., will be exhibited. In addition, a display will be made of belt dressing; represented by Arthur T. Palmer and S. Marshall.

ARCADE MFG. CO., Freeport, Ill.—This company's exhibit will include 36 molding machines, comprising various sizes of Norcross jolt rammers, adapted to making molds and cores, Modern molding machines, squeezers, sand sifters, etc. A large number of these machines will be operated; represented by E. H. Morgan, Charles Morgan, L. L. Munn Jr., F. N. Perkins, August Christen, G. D. Wolfley, Henry Tscherning, B. C. Trueblood, Reeve Burton, G. W. Skinner, R. E. Turnbull and F. E. Boedeker.

ATKINS, E. C., & CO., Indianapolis.—A complete line of saws will be displayed, including sizes ranging from the smallest circular slitting saw to the largest metal saws used, as well as hack saw blades and hack saw frames in a complete variety of patterns, styles and shapes. A high speed power hack saw machine also will be shown in operation; represented by S. M. Perrigo, C. R. Hewitt, William de R. Knight, Lewis Oakey and C. H. Rowlson.

AUTOMATIC TRANSPORTATION CO., Buffalo.—Storage battery trucks for handling

material in industrial plants will be shown in operation; represented by L. J. Goodsell.

AYER & LORD TIE CO., Chicago.—Creosoted wood block flooring for foundries, machine shops and other industrial plants will be exhibited. The floor of this booth will be laid with samples of this creosoted wood block; represented by A. H. Noyes, Frank A. Weaver and B. S. McConnell.

BAIRD & WEST, Detroit.—This exhibit of by-product foundry coke will be made in conjunction with that of Pickands, Brown & Co., Chicago, and will consist of a replica of the rock of Gibraltar built entirely from foundry coke.

BARTLEY, JONATHAN, CRUCIBLE CO., Trenton, N. J.—A complete line of graphite products, including crucibles, retorts, stoppers, nozzles, stirrers, etc., for brass, bronze and aluminum foundry use will be shown; represented by S. H. Dougherty, H. D. Cole, L. T. Ward and Lewis H. Lawton.

BARTON, H. E., TOOL & SUPPLY CO., Chicago.—The products of the Stow Mfg. Co., Binghamton, N. Y., and the Pittsburgh Pneumatic Co., Canton, O., will be exhibited. The former display will consist of electric drills, portable flexible shaft, grinders and small motors, and the Pittsburgh Pneumatic Co.'s exhibit will consist of air tools, such as valveless chipping hammers, heavy duty valve hammers and riveters; represented by W. B. Smith and H. E. Barton.

BENJAMIN ELECTRIC & MFG. CO., Chicago.—Reflectors for electric lamps for shop use will be exhibited.

BENNETT-O'CONNELL CO., Chicago.—Plating equipment will be shown, including a dynamo direct-connected to an alternating current motor, a mechanical plating barrel and an electric cleaning and rinsing tank, which will be operated, an alternating current motor-driven polishing lathe also will be shown, as well as supplies used in connection with the electro-plating and polishing of metals.

BERKSHIRE MFG. CO., Cleveland.—This company will exhibit hand and power squeezer molding machines, coremaking machines, air compressors, flasks, vibrators, etc.; represented by R. H. York, W. A. Price, W. D. Fraser, F. Hulce, E. W. Sample, F. G. Stewart and G. L. Cannon.

BESLY, CHARLES H., & CO., Chicago.—Various types of disc grinders will be operated and samples of oil, pressed steel ring chucks, etc., will be exhibited; represented by Edward P. Welles, Charles A. Knill, William H. Allen, Charles Munson, John Miller Jr., and Murdoch Campbell.

BIRKENSTEIN, S., & SONS, Chicago.—Ingot metals for brass and aluminum foundry use will be exhibited; represented by H. Birkenstein, H. Brown and L. Kahn.

BLYSTONE MACHINERY CO., Cambridge Springs, Pa.—A core sand and facing mixer with screen attached will be shown in operation; represented by W. E. Wright, W. J. Pees and Luther G. Conroe.

BROWN SPECIALTY MACHINERY CO., Chicago.—Three different types of core machines with dies will be displayed, in addition to a tapering machine and a core cutting-off and tapering machine; represented by E. A. Rich Jr., John Laycock and Robert Laycock.

BUCH'S, A., SONS CO., Elizabethtown, Pa.—All of the molding machines built by this company, with the exception of the gravity type, will be shown in operation. These will include hand-operated jar and squeeze and electrically-operated jar and squeeze molding machines. In addition, this company will display sample castings made on gravity and on jar and squeeze machines, cast iron floor flasks, tapered aluminum snap flasks, cast iron pattern plates, treated wood pattern boards, cast iron bottom plates, cast iron casings, cast iron pattern frames, adjustable steel slip flask bars, pattern mountings, etc. One of the features of this exhibit will consist of a four-piece casing, which can be adjusted to molds of any angle; represented by R. S. Buch, W. W. Birnstock, D. C. Coble, H. J. Felsburg, J. E. Buch, J. L. Nute, H. J. Moore, E. P. Pitfield and A. G. Reem.

BUCKEYE PRODUCTS CO., Cincinnati, O.—A complete line of foundry supplies manufactured and sold by this company will be exhibited; represented by C. J. Goehringer, C. S. Weigert, R. B. Ferguson, E. O. Stamm and J. B. Carpenter.

CALUMET FOUNDRY EQUIPMENT CO., Harvey, Ill.—Foundry equipment will be displayed, including ladles, tumbling mills, cupolas, etc.; represented by R. A. Dugan, C. A. Dugan and J. T. Krieger.

CARBORUNDUM CO., Niagara Falls, N. Y.—A complete line of carborundum and aloxite grinding wheels, carborundum and aloxite discs, carborundum rubbing bricks and other abrasives adapted to foundry work will be shown; represented by G. R. Rayner, C. C. Schumaker, O. C. Dobson, J. H. Jackson, R. C. Bradbury and H. E. Kerwin.

CARTER METALS CLEANING CO., Philadelphia.—A sand blast machine for cleaning castings will be shown in operation.

CATARACT REFINING & MFG. CO., Buffalo.—Core oils, cutting oils and cutting compounds will be displayed; represented by R. J. Collins, F. E. Hill, E. P. Hughes and D. L. Baldwin.

CHICAGO PNEUMATIC TOOL CO., Chicago.—Pneumatic tools of various types will be shown, including air drills, grinders, corner drills, sand rammers, riveting and calking hammers; other compressed air-operated equipment will include sand sifters and hoists. A compressor built by this company will be installed to furnish air for operating its equipment; represented by J. G. Osgood, A. C. Andresen, G. W. Parker, A. E. Conrow, C. H. Schumacher and W. C. Walker.

CLARK, CHARLES J., Chicago.—A meter for measuring the volume of cupola blast will be shown in operation and its indication will be compared with that of the ordinary pressure gage; represented by Charles J. Clark.

CLEVELAND PNEUMATIC TOOL CO., Cleveland.—The entire line of pneumatic tools and appliances manufactured by this company will be displayed and chipping hammers, sand rammers, portable emery grinders and other tools adapted to foundry work will be operated. With the exception of riveting hammers, practically all of the tools manufactured by this company are used in foundry work; represented by H. S. Covey, C. J. Albert and Arthur Scott.

CLEVELAND WIRE SPRING CO., Cleveland.—A complete line of steel barrels and boxes for use in foundries and industrial plants generally will be displayed, as well as steel pattern racks and steel shop furniture generally; represented by James Campbell.

CLIPPER BELT LACER CO., Grand Rapids, Mich.—A complete line of belt lacers and supplies will be displayed; represented by W. K. Lee.

COALE, THOMAS E., LUMBER CO., Philadelphia.—A carload of pattern and flask lumber will be displayed, including white pine, spruce, red wood and mahogany. This exhibit will prove a novelty as no display of a similar nature has heretofore been made; represented by Thomas E. Coale.

COWAN TRUCK CO., Holyoke, Mass.—Transveyors used for transporting material in industrial plants will be exhibited and one machine will be shown which has a lifting capacity in excess of 5,000 pounds; represented by E. J. Smith.

CRAWFORD OIL & CHEMICAL CO., Cleveland.—Core oils, match oil, including cores and sand matches made with the use of this material will be shown, as well as waterproofing oil and black paint; represented by George F. Burman, Warner G. Smith and P. S. Crawford.

CURTIS PNEUMATIC MACHINERY CO., St. Louis.—Two electrically-driven air compressors will be operated, one of which will furnish air to the mains for the use of other exhibitors, as well as for the equipment operated in this booth. In addition will be shown a foundry crane equipped with cast steel ends and roller bearing wheels, a closed hopper high pressure sand blast machine, an air hoist and a small trolley system, showing details of construction of hangers, switches, cross-overs and trolleys; represented by E. J. Clark and L. C. Blake.

DAVENPORT MACHINE & FOUNDRY CO., Davenport, Ia.—Eight types of molding machines will be exhibited, including a portable jolt rock-over power, pattern-draw machine; a stationary machine of the former type but of larger capacity capable of jolting and rocking-over a half mold weighing 1,500 pounds; three designs of portable and stationary power squeezers; hand rammed roll-over, plain jolt rammer for making cores equipped with a pattern plate 20 inches square and having a capacity of 700 pounds and a small jolt ramming squeezer, 10 x 32 inches; represented by John T. Anderson, Hugh Gallagher and A. J. Goss.

DINGS ELECTRO-MAGNETIC SEPARATOR CO., Milwaukee.—Magnetic separators adapted to separating metal in brass foundries and refining plants, as well as for recovering iron from foundry refuse in steel, malleable and gray iron foundries, will be exhibited; represented by M. Dings and R. A. M. Manegold.

DIXON, JOS., CRUCIBLE CO., Jersey City.

Convention and Exhibition Program

Friday, Oct. 10.

9:30 a. m.—Opening of the eighth annual foundry and machine exhibition to be held in the International Amphitheater.

Saturday, Oct. 11.

11:00 a. m.—Chicago Foundrymen's Day at the exposition.

Monday, Oct. 13.

Registration and informal reception of visiting foundrymen at the La Salle hotel.

Tuesday, Oct. 14.

10:00 a. m.—Joint meeting of the American Foundrymen's Association, American Institute of Metals and the Associated Foundry Foremen at La Salle hotel with address of welcome by Mayor Harrison.

2:00 p. m.—Separate professional sessions of the American Foundrymen's Association and American Institute of Metals at the La Salle hotel.

Wednesday, Oct. 15.

10:00 a. m.—Separate professional sessions of the American Foundrymen's Association and American Institute of Metals at the La Salle hotel.

10:00 a. m.—Annual meeting of the Associated Foundry Foremen, College room, La Salle hotel.

12:00 noon. — Luncheon at Marshall Field & Co. for the ladies.

2:00 p. m.—Complimentary performance to foundrymen at Bismarck garden.

2:00 p. m.—Theater party for the ladies.

Thursday, Oct. 16.

10:00 a. m.—Separate professional sessions of the allied associations.

2:00 p. m.—Separate professional sessions of the allied associations.

7:00 p. m.—Annual subscription banquet.

8:15 p. m.—Theater party for the ladies.

N. J.—Crucible and graphite products for brass and steel foundry use will be shown; represented by D. A. Johnson, A. L. Haasis, Frank Krug, John A. Condit, W. B. Allen, F. R. Brandon and H. C. Sorenson.

DOGGETT, STANLEY, New York.—Parting and facing compounds, iron and steel cement, silica wash, soapstone crayons and pencils and dry core compounds will be exhibited; represented by Henry A. Hoffman, Robert Allabach and Stanley Doggett.

DUPLEX SHAKER WORKS, Chicago.—Motor and air-driven sand shakers of three different types will be shown in operation; represented by I. E. Burtis, James Scully and M. K. Ross.

ESSLEY MACHINERY CO., Chicago.—A complete operating exhibit of various types of machine tools built by the following concerns will be made: American Tool Works Co., Cincinnati; Barnes Drill Co., Rockford, Ill.; Cincinnati Pulley Machinery Co., Cincinnati; Diamond Machine Co., Providence, R. I.; Kempsmith Mfg. Co., Milwaukee; International Machine Tool Co., Indianapolis, and the Springfield Machine Tool Co., Springfield, O.

FEDERAL FOUNDRY SUPPLY CO., Cleveland.—This company's exhibit will include a complete coremaking unit, consisting of a jarring machine, air compressor and receiving tank, and two sizes of core jarring machines for bench work, one large floor jolt machine, one large jolt roll-over and direct-draw molding machine. An assortment of pattern plates, match plates and matches made from Federal composition, liquid binder, adjustable slip jackets and a bench snap flask outfit also will be displayed; represented by W. M. Adams, Ralph Ditty, John Bayer and Ellsworth Kaye.

FELT & TARRANT MFG. CO., Chicago.—Demonstrations of the comptometer will be made and new models of this machine will be displayed; represented by R. E. Bell, J. M. Furnas, S. C. Brown and H. F. DeRevere.

GARDEN CITY SAND CO., Chicago.—Samples of molding, core and furnace sands, cupola blocks, fire brick, fire clay, sand blast sand, waterproofing compounds, etc., will be shown; represented by C. S. McNeal and William Chambers.

GARDNER GOVERNOR CO., Quincy, Ill.—A complete line of air compressors, both vertical and horizontal types, will be exhibited; represented by J. W. Wall, M. W. Maloney, Laurence Bremser, W. B. Frey, M. D. Cheesman and E. Loeffler.

GARDNER MACHINE CO., Beloit, Wis.—Twenty different types and sizes of disc grinding and polishing machines, as well as disc grinder accessories, will be displayed; represented by F. E. Gardner, L. W. Thompson, W. B. Leishman, E. B. Gardner, J. M. Gardner, D. C. Graves, W. L. Townsend and E. L. Beisel.

GENERAL ELECTRIC CO., Schenectady, N. Y.—The centrifugal blowers will be exhibited, including a 30-horsepower induction motor-driven machine, with a capacity for delivering 3,200 cubic feet of free air per minute against 16 ounces pressure, and one 20-horsepower Curtis turbine-driven machine, with a capacity for delivering 3,200 cubic feet of air per minute, against 16 ounces pressure. One of the features of the operation of this apparatus particularly desirable in cupola work is the extreme steadiness of the blast. The steady melting of iron and the uniform descent of the charges in the cupola are dependent on the maintenance of uniform conditions of air pressure, because the charge in the cupola, to some extent, is supported by the pressure of the blast, and if this varies the charge is liable to descend irregularly, causing unsatisfactory melting conditions.

GILL CLAY POT CO., Muncie, Ind.—Fire clay products, such as brass furnace linings, caps, stops; cupola blocks, etc., will be shown; represented by Charles O. Grafton and John H. Gill.

GLOBE STEEL CO., Mansfield, O.—A complete line of samples of shot for cleaning castings will be exhibited and samples of forgings, gray iron, malleable iron and steel castings cleaned with this shot also will be displayed; represented by P. G. Myers.

GOLDSCHMIDT THERMIT CO., New York.—Demonstrations of welding will be made daily and in addition thermit cans for reviving dull iron in the ladle and making thermit steel, anti-piping cans for preventing piping in steel ingots and the use of thermit for general repair work, will be shown. Various metals and alloys produced free from carbon by the thermit process, including ferro-titanium, manganese, chromium, ferro-chromium, cobalt, manganese-copper and manganese-titanium, also will be displayed; represented by H. S. Mann, E. A. Beck, D. B. Browne and A. F. Braid.

GOODALE CO., Kalamazoo, Mich.—Several complete stoves will be exhibited, the castings for which were molded from match-plates made by the Goodale Co. Floor plates, hinged and fitted with flasks, and a number of machine or bench plates with flasks also will be shown, as well as a wide assortment of castings, including plumbers' brass goods, agricultural implements, gun parts, stove plate, etc., made by the use of Goodale match-plates; represented by J. Goodale, W. C. Bogenschutz and H. C. Howard.

GREAT WESTERN MFG. CO., Leavenworth, Kas.—Gyratory foundry riddles, both electrically and air-driven, will be exhibited; represented by Geo. W. Combs and F. A. Picsett.

GREAT WESTERN SMELTING & REFINING CO., Chicago.—Ingot brass, bronze, etc., and brass and bronze castings made from various ingot compositions, as well as babbitt and pig metals, will be shown; represented by J. N. Perlstein, A. L. Levy, Arthur Lewis and J. H. Collins.

HANNIFIN MFG. CO., Chicago.—A line of pneumatic tools for foundry use will be shown.

HAYWARD CO., New York City.—A new electrically-operated clam-shell bucket for foundry use will be displayed.

HERMAN PNEUMATIC MACHINE CO., Zelienople, Pa.—The molding machines and other equipment that will be exhibited by this company include the following: A new design of jar-ramming independent roll-over and pattern-drawing machine, which will be operated; a jar-ramming stripping-plate machine equipped with hand pattern-drawing device; jar-ramming core machines and a number of large sizes of jarring machines in addition to a new type of vibrating sand sifter; represented by A. M. Frauenheim, H. L. Heyl, A. Rodgers, A. Herman, Lewis H. Palmer and Robert F. Ringle.

HILL-BRUNNER FOUNDRY SUPPLY CO., Cincinnati.—A display will be made of samples of graphite, plumbago and foundry facings, as well as other foundry supplies; represented by John Hill and M. Z. Fox.

HILL & GRIFFITH CO., Cincinnati.—A complete line of chaplets and foundry specialties will be displayed; represented by D. T. Richards, Wm. Oberhalman, J. M. Glass, Jas. A. Carey, F. W. Weissmann, George H. Kersting, J. H. Lyle and F. McCarthy.

HOEVEL SAND BLAST MACHINE CO., New York.—Several dustless, self-contained sand blast machines will be shown in operation and the Wiener Machinery Co. also will display a triple combination punch, shear and bar and angle cutter; represented by George A. Cooley, Jesse J. Bowen, R. B. Franken, Ernst Wiese, George J. Ballweber and F. H. Scantlebury.

HOSKINS MFG. CO., Detroit.—Two electric furnaces for heat-treating carbon and high speed steels will be shown in operation and daily demonstrations will be made of tool

Program, American Foundrymen's Association

Tuesday, Oct. 14.

10 a. m.:—Addresses of welcome and responses.

Reports of officers of the American Foundrymen's Association, American Institute of Metals and Associated Foundry Foremen.

Reports of committees, etc.

2 p. m.:—Joint session. Address by M. W. Alexander, General Electric Co., Lynn, Mass., entitled "Apprenticeship System in the Metal Industries."

Address by C. E. Knoeppel, New York City, entitled "How to Make a Time Study."

Wednesday, Oct. 15.

"Gray Iron for Motor Car Castings," by H. B. Swan, Detroit.

"Electric Steel Castings," by F. T. Snyder, Chicago.

"Pouring Steel Castings," by R. A. Bull, Granite City, Ill.

"The Pattern Shop as Related to the Steel Foundry," by E. R. Swanson, Granite City, Ill.

"Some Observations on Miniature or Detachable Open-Hearth Furnaces," by W. M. Carr, Erie, Pa.

"The Electric Furnace for Steel Castings," by Albert Hiorth, Christiania, Norway.

"Changing the Composition of Malleable Cast Iron," by P. Rodigin, Berdiansk, Russia.

"A Study of the Annealing Process for Malleable Castings," by E. J. Leasman, Boscovel, Wis.

"Malleable Difficulties," by Dr. Richard Moldenke, Watchung, N. J.

Thursday, Oct. 16.

"The Need of Standard Specifications for Cast Iron," by R. S. MacPherran, West Allis, Wis.

"Memoranda on Automobile Cylinder Founding," by Robert Crawford, Detroit.

"Core Tests and Specifications," by H. M. Lane, Detroit.

"Testing Molding Sands Under Commercial Conditions," by Prof. E. A. Johnson, Boston.

"Vital Points in Foundry Practice," by J. J. Wilson, Detroit.

"The Carnegie Institute of Technology," by C. B. Connelley, dean, Pittsburgh.

"Put Your House in Order," by Frederick A. Parkhurst, Detroit.

"The Need of a Common-Sense Cost System for the Foundry," by E. W. Riker, New York City.

2 p. m.:—"Iron, Where Does it All Go?" by D. C. Wilson, Newark, N. J.

"The Relative Value of Foundry Flour, With Simple Methods of Testing," by G. S. Evans, Lenoir City, Tenn.

"Memoranda on Accident Prevention," by Thomas D. West, Cleveland.

"The Use of Powdered Coal as Fuel," by W. S. Quigley, New York City.

"The Centrifugal Blower for the Foundry," by Dr. Richard Moldenke, Watchung, N. J.

"Oxy-Acetylene Welding and Cutting," by W. S. Hoyt, Chicago.

Election of officers.

hardening. In addition, pyrometers, electric furnaces, hot plates, voltmeters and ammeters will be shown; represented by C. F. Busse, W. D. Little and A. B. Tilton.

HUNTER SAW & MACHINE CO., Pittsburgh.—The equipment that will be shown by this company will include a machine for grinding teeth of inserted-tooth saws, a saw grinder and beveling machine; 21-inch, 26-inch, 30-inch, 36-inch and 40-inch diameter inserted-tooth saw; 24-inch saw for cutting hot tubes; 36-inch saw for cutting hot ingots and forgings; a 44-inch vanadium steel, high speed friction saw for cutting rails, structural shapes, bar iron, steel, etc., and an extensive line of saws for various types of metal cutting machines; represented by F. A. Hunter and G. W. Agerter.

IDEAL FURNACE CO., Chester, Pa.—A tilting crucible furnace for melting iron, copper, brass, bronze, aluminum, etc., will be exhibited; represented by P. J. Sweeney.

INDEPENDENT PNEUMATIC TOOL CO., Chicago.—The equipment that will be shown by this company will include a new single valve pneumatic chipping, calking and flue-bending hammer, designed especially for iron and steel foundry service; pneumatic sand rammers, electric drills, one-piece pneumatic long stroke riveting hammer, center spindle and close-quarter piston air drills, wood boring machines and a pneumatic grinder particularly adapted for foundry use; represented by J. D. Hurley, R. T. Scott, George C. Wilson, B. A. Durbin, Fred J. Passino and W. R. Gummers.

INGERSOLL-RAND CO., New York.—A complete line of pneumatic tools for foundry use will be shown, including sand rammers, pneumatic chipping hammers, pneumatic piston drills, pneumatic motor hoists and stationary motors. Two motor-driven air compressors will be operated for furnishing air to the other exhibitors. One will supply air at 100 pounds pressure and the other at 50 pounds pressure; represented by W. H. Armstrong, W. A. Armstrong, James Moran, J. L. Kelly, Lloyd J. David, James P. Gillies, Grover C. Lucker, John D. Rathbun and C. W. Bugbee.

INTERNATIONAL MOLDING MACHINE CO., Chicago.—The molding machines to be displayed by this company will include power squeezers, with 9-inch, 10-inch and 13-inch cylinders; two stripping plate machines, for small and large heavy work, respectively; jarring machines operated by air and electricity and one special machine for making cores; one 22 x 20-inch and 8-inch draw, hand turn-over draw machine and a special machine of this type for making cores; one 30-inch, 8-inch cylinder and 12-inch draw, turn-over; power turn-over, power draft machine and the following combination machines: Air jar-ramming, hand turn-over draw, electric jar-ramming, hand turn-over draw, air jar-ramming, power turn-over, power draw and one stripping plate squeezer; represented by Edward A. Pridmore, W. W. Miller, J. W. Dopp, E. H. Schwartz and D. C. Snow.

INTERSTATE SAND CO., Zanesville, O.—Various grades of molding sands and clays for foundry use will be shown; represented by F. L. Moore.

THE IRON TRADE REVIEW, Cleveland.—Represented by John A. Penton, A. O. Backert, W. C. Howe, J. D. Pease, H. Cole Estep, L. C. Pelott, A. L. Klingeman, Fred S. Sly and Tadao Ono.

JENNISON-WRIGHT CO., Toledo.—"Kreolite" blocks in the form of sections of floors for foundries, machine shops, casting, cleaning and stock rooms will be shown, as well as blocks adapted to different kinds of factory floor work. The method of attaching machinery to these floors also will be demonstrated; represented by F. E. Jennison and F. M. Enwright.

KAWIN, CHARLES C., CO., Chicago.—This firm of chemists and metallurgists will be represented by Charles C. Kawin, J. F. Nellis, R. J. Courtney, William J. Mulcahy and J. H. Hopp.

KELLY, T. P., & CO., New York.—The space reserved by this company will be furnished as an office and rest room; represented by Walter F. Kaine Jr. and Edwin R. Wolverton.

KING, JULIUS, OPTICAL CO., New York City.—Goggles for protecting the eyes of foundry operators will be exhibited; represented by J. T. Brayton and J. J. Duffy.

KNICKERBOCKER CO., Jackson, Mich.—A Morse rarefied dust collector built by this company will be shown. This collector is installed between the source of dust and the fan, thereby separating the dust from the air before the latter reaches the fan; represented by W. B. Knickerbocker.

LUPTON, DAVID, SONS CO., Philadelphia.—Equipment for lighting and ventilating foundries and other industrial plants and designs for special roof formations will be shown. A large number of photographs also will be displayed, showing the installation of Lupton products; represented by Clark P. Pond and R. A. Sanborn.

McCORMICK, J. S., CO., Pittsburgh.—This exhibit will consist of a facing and core sand mixer, pistol sprayer, cupola lighter, foundry supplies, blacking and a general line of facings; represented by J. S. McCormick, T. E. Malone and S. R. Costley.

McLAIN'S SYSTEM, Milwaukee.—This exhibit will consist of semi-steel castings of light section, such as automobile cylinders, test bars, etc., containing 30 per cent steel; represented by David McLain, I. V. Scanlan, Harry McLain and C. W. Miller.

MACLEOD CO., Cincinnati.—This company will exhibit a 4,000-pound capacity sand blast machine, sand separator, oil burners for lighting cupolas and skin-drying molds and an oxy-acetylene plant for welding and cutting; represented by Walter Macleod, J. W. Mooney and Fred Neumann.

MANUFACTURERS EQUIPMENT CO., Chicago.—Chucks and collapsible taps will be shown; represented by Charles George and Paul J. Grebel.

MARSHALL & HUSCHART MACHINERY Co., Chicago.—Practically the entire machine tool exhibit that will be made by this company will be operated. The machines that will be shown, with the names of the builders follow: Baker Bros., Toledo, O., high speed drill and key seater; Acme Machine Tool Co., Cincinnati, flat turret lathe and an 18-inch universal turret lathe; Willard Machine & Tool Co., Cincinnati, 13-inch gap lathe and 13-inch tool room lathe; Greaves, Klusman & Co., Cincinnati, 15-inch standard heavy pattern engine lathe and a 17-inch standard heavy pattern engine lathe with geared head; Gould & Eberhardt, Newark, N. J., 28-inch shaper with variable speed motor drive and a 12 x 6-inch gear hobber; Rockford Drilling Machine Co., Rockford, Ill., 23-inch heavy duty gang drill; Landis Machine Co., Waynesboro, Pa., 1½-inch double head bolt cutter; Cincinnati Planer Co., Cincinnati, 36 x 36-inch x 8 foot heavy pattern planer with reversible motor drive; Lodge & Shipley Machine Tool Co., Cincinnati, 16-inch x 6-foot tool room lathe and 18-inch x 8-foot selective head lathe; Cincinnati Bickford Tool Co., Cincinnati, 4-foot plain radial drill with variable speed motor and a 24-inch shaft-driven drill press; Bullard Machine Tool Co., Bridgeport, Conn., 36-inch vertical turret lathe with water attachment; Cincinnati Milling Machine Co., Cincinnati, vertical and universal milling machines and a universal cutter and reamer grinder. Other equipment that will be displayed will include a La Salle surface grinder and Partridge grinders.

MIDLAND MACHINE CO., Detroit.—This operating exhibit will consist of a power jar-ramming roll-over molding machine, the Grimes hand-rammed roll-over molding machine and a new method of mounting patterns will be demonstrated; represented by G. L. Grimes and Charles Sheffington.

MONARCH ENGINEERING & MFG. CO., Baltimore.—An extensive display of melting and heating furnaces will be made, including the following types: Tilting iron pot for soft metals, tilting foundry coke-fired, tilting oil-fired, tilting gas-fired, stationary oil or gas drop-bottom pit furnaces, stationary oil or gas foundry furnaces, portable car type tilting furnace for melting metals, combination triple shop furnaces for tool rooms, combination 8 in 1 furnaces for tool rooms, oil rivet and blacksmith forges, ladle heaters, core ovens, lead hardening and melting furnaces, etc.; represented by H. D. Harvey, James H. Fowler, M. W. Woodburn and James J. Allen.

MOTT SAND BLAST MFG. CO., Chicago.—This exhibit will be made in conjunction with that of this company's eastern branch, the De La Vergne Machine Co., New York City. A dustless sand blast will be shown in operation and a model sand blast room, completely equipped, will be exhibited; a hose sand blast machine also will be shown; represented by David Mayer and E. J. Rosenthal.

NEW HAVEN SAND BLAST CO., New Haven, Conn.—A self-contained sand blast bar-

Program, American Institute of Metals

Tuesday, Oct. 14.

2 p. m.:—"Apprenticeship System in the Metal Industries," by M. W. Alexander.

"How to Make a Time Study," by C. E. Knoeppel.

"Report of Official Chemist," by C. F. Woods.

"Report of Bureau of Mines," by C. L. Parsons.

"Report of Bureau of Standards," by G. H. Clamer.

"Internal Strain in Bronze Castings," by J. E. Howard.

"Work in Metals of the Bureau of Standards," by G. K. Burgess.

"Nomenclature of Non-Ferrous Alloys," by G. B. Burgess.

"Brass Foundry of the Future," by C. P. Karr.

Wednesday, Oct. 15.

10 a. m.:—"Efficiency Engineering in the Foundry," by E. A. Barnes.

"Scientific Management," by W. M. Corse.

"Scientific Management," by F. A. Parkhurst.

"How Scientific Management Works in Our Plant," by C. B. Bohn.

"Core Room Economics," by O. F. Flumerfelt.

"Boiling of Metals," by Dr. J. W. Richards.

Thursday, Oct. 16.

"Producer Gas for Brass Melting," by E. F. Bulmahn.

"Commercial Operation of the Hering Furnace," by G. H. Clamer.

"Silver Plating and Spotting-Out," by C. F. Burgess.

"Fluxes for Soft Solders," by W. Arthur.

"Aluminum Solders," by W. Arthur.

"Approximate Melting Points of Some Commercial Alloys," by A. B. Norton and H. W. Gillett.

rel will be shown in operation, and a new automatic hose type machine for cleaning large work also will be displayed; represented by Chas. A. Dreisbach and Chas. S. Johnson.

NORMA CO. OF AMERICA, New York.—A complete line of anti-friction bearings and minimeters for precision measurements will be displayed. The ball bearings built by this company are of the non-adjustable type, being especially designed for high speed service. In addition, roller and ball thrust bearings also will be shown. The Hirth minimeter is a German instrument of great precision, which is of great value in duplicate or interchangeable production. It will be shown in a number of mountings covering every possible requirement for inside and outside measurements in manufacturing processes; represented by W. M. Nones and George R. Bott.

NORTON CO., Worcester, Mass.—Demonstrations will be made of swing frame grinding machines, flexible shaft grinding machine, new model 2-inch floor stand grinder, new model ¾-inch bench grinder and Alundum and Crystolon grinding wheels used in foundry work also will be shown. To illustrate Alundum muffles and pyrometers a Hoskins furnace also will be operated; represented by E. W. Dodge, Carl F. Dietz, John Horne, C. E. Gillett and R. G. Williams.

OBERMAYER, S., CO.—A complete line of foundry equipment and supplies will be exhibited, including the Todd rumbler, rosin grinder, core ovens, sand drying stove, sprue cutter, ladle shanks, sand sifters, molders' tools, core and molding benches, molding trough, core venting machine, chaplets, brushes, riddles, flasks and flask trimmings, rapping plates, dowel pins, leather and wood fillets, shovels, flask clamps, facings, graphite, parting and core compounds, core binders, oils, etc. In addition, the following companies will exhibit in this booth: Emmert Mfg. Co., Waynesboro, Pa., complete line of vises for pattern shop use; Blake & Knowles Steam Pump Co., New York City, core wire straightening machines and wire cutters; P. H. & F. M. Roots Co., Connersville, Ind., positive pressure blowers for foundry use; Ransom Mfg. Co., Oshkosh, Wis., emery grinders, and the Hauck Mfg. Co., Brooklyn, N. Y., fuel oil torches for lighting cupolas, drying molds, cores, etc. Represented by Theodore Kauffman, president; E. D. Frohman, S. T. Johnston, C. H. Green, J. J. McDevitt, J. E. Evans, O. J. Peterson, C. M. Barker, F. H. Dodge, W. Fitzpatrick, O. C. Olson, A. N. Wallin and G. P. Peterson.

OHIO SAND CO., Conneaut, O.—Samples of various grades of molding sand will be displayed; represented by F. E. Gordon and U. E. Canavel.

OLIVER MACHINERY CO., Grand Rapids, Mich.—Pattern shop and wood-working machinery will be shown in operation, including a universal milling machine, two types of gap lathes, two types of boring machines, two types of motor-driven lathes, universal sander, double disc sander, universal saw bench, surfacer, two types of jointers, combination patternmakers' lathe, motor-driven band saw, universal grinder and a complete set of filing room tools; represented by G. F. Reinhard, J. W. Oliver, V. M. Tuthill, M. D. Baldwin, W. Y. Mintzer, A. Blake, A. S. Kurkjian and J. C. Whitney.

OSBORN MFG. CO., Cleveland.—An extensive operating exhibit of molding machines will be made, including plain jolt ramming, direct draw roll-over jolt rammers, drop plate and stripping plate machines, air squeezer and drop plate flask-stripping squeezer machines, direct draw roll-over machines, roll-over rock-down and rock-over drop-draft machines; represented by H. R. Atwater, E. S. Carman, J. H. Galloway, E. F. Streich, W. M. Zeman, E. T. Doddridge and J. A. Patterson.

OXWELD ACETYLENE CO., Chicago.—An operating exhibit of oxy-acetylene welding apparatus as applied to foundry work for cutting risers, shrink-heads, etc., from castings will be made; represented by H. P. Harding, W. S. Hoyt, C. H. Dockson, J. A. Warfel, W. H. Yetman, E. E. Radcliffe, J. H. Williamson, J. V. Upton, G. M. Bailey, J. R. Wilson, Karl Byington, W. H. Johnson and C. R. Sutton.

PANGBORN CORPORATION, Hagerstown, Md.—Equipment for cleaning castings by the sand blast process will be shown in operation, including a hose type machine and a sand blast tumbling barrel. In addition, a sand separator, sand dryer, air and moisture separator and a special sand blast car will be exhibited; represented by Thomas W. Pangborn, John C. Pangborn, H. D. Gates and Foster J. Hull.

PAWLING & HARNISCHFEGER CO., Milwaukee.—A new type crane trolley, a 3-ton hoist and a ¾-yard bucket in operation on a special structural frame will be displayed in addition to I-beam trolleys, motors and controllers; represented by A. G. Hendricks, Arthur Fritsch, R. A. S. Johnson and Bruno Fritsch.

PAXSON, J. W., CO., Philadelphia.—Sand blast machines, tilting sand blast tumbling barrels, hand cleaning machines and a suction elevator and separator will be shown in operation. A large number of blue prints and photographs of recent sand blast installations also will be displayed; represented by Howard M. Bougher, W. S. Thomas and L. F. Kremer.

PEERLESS PARTING CO., Ottawa, Ill.—Samples of parting manufactured by this company will be displayed and the booth will be fitted up as an office and rest room; represented by C. A. Hupp.

PENNSYLVANIA STEEL CO., Philadelphia.—Samples of Mayari pig iron will be displayed; represented by F. P. Bassett and Robert Gross.

PETERSON-NATIONAL CO., Chicago.—Samples of this company's products, including core oil, dry core compound and parting will be displayed, and cores made with this compound and oil, obtained from numerous large foundries, also will be shown. One of the interesting features of this exhibit will be an electrically-operated core oven, which will be operated; represented by James A. Drake, John Purvis, R. W. Bull, H. S. Peterson, G. W. Doty, James Johansen and Myles Monahan.

PICKANDS, BROWN & CO., Chicago.—The display of by-product coke to be made by this company will be in conjunction with that of Baird & West, Detroit. It will consist of a replica of the rock of Gibraltar built from coke; represented by J. A. Galligan, B. T. Bacon, G. A. T. Long, Frank T. Lovering, Thomas W. Glasscot, E. A. Bateman, R. S. Dutton, C. L. Miner and F. L. Schulze.

PREST-O-LITE CO., INC., Indianapolis.—Two complete oxy-acetylene welding outfits will be displayed, equipped with 100-cubic-foot and 300-cubic-foot cylinders and samples of welding by these machines also will be shown. One of these welding machines will be operated and demonstrations will be made daily; represented by George D. Armstrong, E. J. Rork, W. H. Adkinson, and L. L. Sinclair.

PRIDMORE, HENRY E., Chicago.—Practically all of the machines comprising the extensive line manufactured by this company will be operated, including stripping plate machines, rock-over drop molding machines, power squeezers, plain electric-driven jarring machines, combination electric jolt rock-over drop molding machines, electric jolt stripping plate machines, power-ramming stripping plate machines and hand squeeze stripping plate molding machines; represented by Mrs. E. M. Pridmore, H. A. Pridmore, A. V. Magnuson, T. J. Magnuson, D. F. Eagan, C. H. Ellis and Arthur Leidig.

QUIGLEY FURNACE & FOUNDRY CO., New York City.—A continuous baking core oven will be shown and photographs of furnaces and powdered coal burning equipment will be displayed; represented by W. S. Quigley, Paul Ramp, William Brewster, H. B. Dempsey and A. W. Moyer.

QUITMAN FOUNDRY & MACHINE CO., Quitman, Ga.—Two permanent mold casting machines equipped to produce car journal bearings will be shown. These machines are adapted to the production of articles in ferrous and non-ferrous metals in which rods, chaplets and dry sand cores are inserted into the mold cavity; represented by W. W. McCarter.

RACINE TOOL & MACHINE CO., Racine, Wis.—Motor-driven, high speed metal cutting machines of three different types; represented by J. M. Jones.

ROBESON PROCESS CO., Pennington, N. J.—Samples of "Glutrin" for core mixtures will be displayed; represented by D. S. Robeson, W. E. Baird and T. J. Ryan.

ROBINSON, WM. V., CO., Owosso, Mich.—Machines adapted to polishing flat and oval castings, such as stove parts, sad irons, registers, etc., will be shown in operation; represented by Wm. V. Robinson, George Valentine.

ROCK ISLAND MFG. CO., Rock Island, Ill.—Machinists' and patternmakers' vises will be displayed.

ROGERS, BROWN & CO., Cincinnati.—The moving pictures entitled "From Mine to Molder," which proved one of the most attractive features of the Buffalo exhibit, will be displayed in an auditorium in the south straightaway building. The pictures will be shown five times daily throughout the exhibition period and the auditorium will have a seating capacity of approximately 500. In addition, this company has reserved a space in the arena where an extensive line of pig iron, coke, ferro-manganese and fluorspar will be displayed; represented by M. Cochrane Armour, E. L. Billingslea, Henry B. B. Yergason, C. A. Stillman, F. I. Foote, C. E. Bertie, L. C. Calkins, A. B. Weaver, A. O. Sonne, H. S. Smith, E. L. Ives, Wm. S. Rogers, F. J. Waldo, Wm. P. Cheney, S. W. Hubbard, O. Arlt, R. W. Clark, J. C. Mears, F. W. Bauer, R. D. Meacham, Edwin Raum, Perrin Rule and C. J. Olson.

SAND MIXING MACHINE CO., New York City.—A new design of self-propelled sand cutting machine and a new type of sand cutting machine for use in heavy machinery foundries, jobbing shops, steel and malleable foundries will be shown in operation. The latter machine is suspended from a bridge crane; represented by V. E. Minnich, W. A. Heartt, Hutton H. Haley, John Bradley and C. H. Benham.

SELLERS, WILLIAM, & CO., INC., Philadelphia.—The equipment to be shown will include centrifugal sand mixing machines, both belt and motor-driven, a drill grinding machine, motor-driven, and a universal tool grinding and shaping machine; represented by Edward L. Holljes.

SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y.—The handling and conveying equipment to be shown by this company will include a two-motor, pulpit-controlled electric traveling hoist, an overhead electric traveling crane trolley having a capacity of 10 tons and a cage-controlled, overhead electric traveling monorail hoist; represented by F. A. Hatch, R. H. McGreedy, W. B. Briggs and N. Prakken.

SILICA PRODUCTS CO., Chicago.—A new facing and wash to facilitate the production of clean castings is being manufactured by this company, and the results obtained will be shown in the form of castings which have been removed from the sand without further cleaning. A fluxing compound and scavenger also will be displayed, which, when introduced

in the cupola or added to the molten metal in the ladle, will decrease the sulphur and phosphorus in the iron or steel, and it is claimed will increase the strength and decrease shrinkage.

SLY, W. W., MFG. CO., Cleveland.—A complete sand blast cleaning mill outfit will be exhibited, as well as a large number of photographs of this company's cleaning room equipment; represented by W. C. Sly, George J. Fanner, P. W. Graue and T. J. Morgan.

SMITH, R. P., & SONS CO., Chicago.—Safety congress shoes for molders will be shown; represented by J. B. Smith Jr.

SNEAD & CO. IRON WORKS, Jersey City, N. J.—An 8-foot x 30-inch MacDonald roller-ramming molding and pattern-drawing machine will be operated, making patterns from match plates containing eight radiator sections, three sections of stove pipe and a large ornamental casting. To handle the sand when making the molds, a special dumping box will be utilized, which eliminates hand shoveling; represented by H. P. MacDonald, W. E. Martin, P. W. Jordan and Ira S. Snead.

STANDARD SAND & MACHINE CO., Cleveland.—A complete line of sand mixing, tempering and conveying machinery will be exhibited, including five sizes of batch mixers, a centrifugal pulverizer; a mixing, rolling and bonding machine; charging hoppers, elevator boots and bucket and chain elevators. Samples of molding sand for all classes of foundry work also will be shown; represented by H. G. Boughton, J. A. Boughton, H. E. Boughton, J. L. Hopper, F. S. Scoville and R. S. Hoffman.

STERLING WHEELBARROW CO., West Allis, Wis.—Rolled steel foundry flasks, wheelbarrows, skim gates, gate sticks, snap flasks and foundry wedges will be exhibited; represented by I. R. Smith, H. H. Baker, J. J. Coyne, E. W. Dowd and G. H. Lambkin.

STEVENS, FREDERIC B., Detroit. — A complete line of foundry facings, plumbago, core wash and polishers' and platers' supplies will be shown; represented by Frederic B. Stevens, James F. Hughes, Joseph M. Johnston, A. T. Wagner and David D. Baxter.

SUPERIOR SAND CO., Cleveland.—Samples of a complete line of molding sands for the production of aluminum, brass, gray iron and malleable castings, as well as special sands for car wheel and heavy machinery work, will be shown; represented by W. H. Smith and H. C. Koontz.

TABOR MFG. CO., Philadelphia.—None of the extensive line of molding machines built by this company will be exhibited, but an unusually attractive display of mounted photographs will be made, showing all sizes and types of Tabor molding machines and the results obtained by their use in various foundries throughout the country; represented by Wilfred Lewis, H. W. Brown, J. T. Ramsden, J. C. Coleman, Dudley Willcox, G. B. Hastings, D. J. Martin and H. W. Impey.

TITANIUM ALLOY MFG. CO., Niagara Falls, N. Y.—Special titanium products for the treatment of iron and steel and nonferrous metals will be shown; represented by H. H. Cook and Charles Vickers.

UNITED STATES GRAPHITE CO., Saginaw, Mich.—The space reserved by this company will be equipped with chairs, desks, etc., for the accommodation of visitors, but no display will be made of the extensive line of United States graphite products; represented by H. C. Woodruff, J. G. Drought, F. B. Godard, Mr. Williams and Mr. Webb.

U. S. MOLDING MACHINE CO., Cleveland.—A large number of the machines that will be displayed by this company will be operated and the exhibit will include a plain air squeezer; combination jar-ram, squeeze, pattern-drawing machine; 3-inch, 4-inch and 8-inch plain jar molding machines; 8-inch combination jar-ram pattern-drawing machine, combination jar-ram, roll-over, pattern-drawing machine; vibrators, etc.; represented by J. N. Battenfeld.

VULCAN ENGINEERING SALES CO., Chicago.—The extensive line of molding machines manufactured by the Mumford Molding Machine Co. will be shown in operation, including various types of jolt rammers, both air and electrically-operated, plain power squeezers, split pattern vibrator machines, etc., as well as pneumatic vibrators. The Q. M. S. Co. will exhibit metal saws, cranes, hoists and trolleys and the Hanna Engineering Works will make a display of screen shakers, dumping riddles and mold dryers; represented by E. H. Mumford, James T. Lee, J. T. Georgeson, W. H. Huelster, Carl Falk, A. B. Caleen, David M. Whyte and T. J. Mumford.

WADSWORTH CORE MACHINE & EQUIPMENT CO., Akron, O.—The core room equipment that will be exhibited by this company includes the following: Two sizes of core machines mounted on iron tables and legs, two sizes of core cutting-off and coning machines also mounted on iron tables and legs, jar-ramming coremaking machine, sand mixing and compound mill, core testing machine, core oven and sample cores made on the coremaking machines built by this company; represented by George H. Wadsworth and M. C. Sammons.

WEBB, J. F., MFG. & SUPPLY CO., Davenport, Ia.—Two pneumatic power ramming molding machines will be shown in operation; represented by J. F. Webb.

WEST HAVEN MFG. CO., West Haven, Conn.—Lathe tools of various kinds will be displayed.

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa.—Represented by R. H. Moore, D. A. Moran and A. L. Hampton.

WHITING FOUNDRY EQUIPMENT CO., Harvey, Ill.—The equipment to be exhibited will include a two-ton steel converter and tilting mechanism which is operated by a motor; 6,000-pound tea pot spout ladle, two-motor electric crane trolley operating a 1½-cubic yard quick detachable grab bucket, a section of drawer type core oven and an exhaust tumbling barrel. Photographs also will be displayed of installations of this company's equipment and blue prints will be available, showing lay-outs of recently complete foundry plants, etc.; represented by C. A. Hardy, P. A. Dratz, R. E. Prussing and R. H. Bourne.

WILLSON, T. A., & CO., INC., Reading, Pa.—A new eye protector will be shown by this company designed for use by chippers and other foundry employes. The new style glass combines new features of comfort, adaptability and protection. In addition, other goggles, eye glasses, etc., will be displayed; represented by Frederick Willson, Harold W. Davie and Benjamin T. Roberts.

WILMARTH & MORMAN CO., Grand Rapids, Mich.—A motor-driven wet surface grinding machine will be shown in operation and other equipment will include a motor-driven drill grinder and double end drill grinder with a drill holder for grinding large drills on one end and small drills on the other, and a combination cutter, reamer and drill grinder; represented by E. T. Gorham and H. L. Saunders.

WOODISON, E. J., CO., Detroit. — The booth of this company will be fitted up as an office; represented by E. J. Woodison, E. B. Fleury, R. H. Mills, M. A. Bell and J. A. Disney.

WRIGHT MFG. CO., Lisbon, O.—A complete line of high speed hoists, screw chain hoists and plain and geared trolleys will be shown; represented by H. H. Wright, C. F. Wright, F. W. Henderson and R. C. Blair.

WYOMING SHOVEL WORKS, Wyoming, Pa.—A complete line of foundry and molders' shovels will be shown, as well as an extensive line of shovels for other work; represented by G. E. Geer.

Putnam Machine Co. Changes Hands

The entire capital stock of the Putnam Machine Co., of Fitchburg, Mass., has just been purchased by Manning, Maxwell & Moore, Inc., of New York. The Putnam Machine Co. is the pioneer machine tool manufacturer of the country. The company was started in a small way in 1836 by Salmon W. and John Putnam. From a small beginning the company has grown until today its plant covers about 14 acres in Fitchburg. It produces heavy railroad machine tools, such as locomotive driving wheel lathes, coach wheel lathes, axle lathes, car wheel borers, hydrostatic wheel presses and metal planers and lathes of all sizes.

Of the old stockholders of the Putnam Machine Co., S. W. Putnam, son of the founder and himself a designer of wide reputation, and his son, S. W. Putnam 3d, will retain their connection with the company, which will retain the name of the Putnam Machine Co., and be operated on its own identity, as are the various other subsidiary companies of Manning, Maxwell & Moore, Inc. The stock which has hitherto been carried at 85 Liberty street, will be carried at the Jersey City Distributing Station, 446 Communipaw avenue, Jersey City, N. J., from which point shipments will be made. Manning, Maxwell & Moore have recently taken new offices of about 24,000 square feet, (double their present office quarters) on the twentieth and twenty-first floors of the building at 119 West Fortieth street, New York, which will be occupied shortly.

Pittsburgh Foundrymen's Association

The regular monthly meeting of the Pittsburgh Foundrymen's Association was held Oct. 6 at the Fort Pitt hotel. Lew R. Palmer, chief factory inspector of the state of Pennsylvania, spoke on "The State Department of Labor and Industry and the Foundry and Machine Shop Trade". Dr. R. Moldenke, secretary of the American Foundrymen's Association, told about the annual foundrymen's convention, to be held at Chicago, Oct. 14 to 16.

The Marseilles Wrapping Paper Co., Marseilles, Ill., advises its plant is to be rebuilt, but machinery was so badly damaged by fire much is to be scrapped.

Many Millions of Tons of Ore Not Controlled

By Steel Corporation or Other Operating Companies—Hearings in Dissolution Suit Resumed—Final Decision of Case is Far in the Future

Hearings of witnesses for the defense in the suit of the government for the dissolution of the United States Steel Corporation, were resumed last Wednesday, following a recess over the summer months. The first witnesses called were iron ore experts from the Lake Superior district. They were Dr. C. K. Leith, professor of geology at the University of Wisconsin; George P. Crosby, owner of important holdings on the Cuyuna range; Chester E. Tripp, president of the Rogers-Brown Ore Co.; Carl Zappfe, who does ore exploratory work for the Northern Pacific railroad; William N. Merriam, geologist for the Oliver Iron Mining Co., and William J. Olcott, president of the Oliver Iron Mining Co.

The testimony of these witnesses was to the effect that the Steel Corporation does not have anything approaching a monopoly of the ore properties in the Lake Superior district. They declared unanimously that the action of the Michigan State tax commission, in arbitrarily fixing the depth of mines on the old ranges as 100 feet below the lowest working level gave an erroneous impression of the extent of the ore reserves on the old ranges. They were all of the opinion that workings in nearly all the mines on the old ranges can be carried to a depth of at least 6,000 feet. Had the ore at these depths been included in the report of the Michigan state tax commission, they said, the percentage of the old range ores controlled by the Steel Corporation would have been reported as much smaller.

They also called attention to new bodies of ore which have been discovered in the past few years on the ranges. A great many of these are for sale, they testified, and, if given sufficient time to complete negotiations any one could secure control of millions of tons of high-grade ore at reasonable prices. The ore now available for purchase is scattered about on all of the different ranges. They also testified that in 1901, not including the ores controlled by the Steel Corporation, there were available ore properties capable of producing 6,000,000 tons a year.

A number of other ore experts will be called to the stand before this phase of the case is closed. Other subjects will be taken up later. It is expected that the present series of hearings will last until about the first of the year. It is believed that opposing counsel will not be ready to argue the case before the circuit court in Trenton, N. J., before the latter part of next year. After that the case will undoubtedly go to the Supreme Court.

Dr. Leith's Testimony

The first witness was Dr. C. K. Leith, professor of geology at the University of Wisconsin, and non-resident professor of structural geology at the University of Chicago. Dr. Leith is recognized as one of the foremost authorities on the iron ore deposits of the Lake Superior district.

During 1911-1912 he served as expert on the Michigan state tax commission in connection with the task of revaluing the ore properties in that state. From 1897 to 1910 he was engaged almost continuously in work on the Lake Superior district for the United States geological survey. He is the author of monograph No. 52, recently published by the survey; this work is a general summary of the geological data collected in the Lake Superior district. Dr. Leith also has been engaged at various times in a consulting capacity by various ore roads and mining companies.

In answer to questions by David Reed Jr., of counsel for the defense, the witness explained that for valuation purposes it is the custom of the Michigan state tax commission arbitrarily to fix the depth of the various mines at a distance 100 feet below the lowest developed level. In most cases, however, said Dr. Leith, it has been found that the ore below this arbitrary level is of exactly the same quality as that nearer the surface. As a result, he said, it is known that the quantity of commercially valuable ore in Michigan forms a far greater reserve than is indicated by the reports of the state tax commission. The ore reserves in Michigan owned by the United States Steel Corporation, said Dr. Leith, were about 30 per cent in 1911. In 1912, due to discoveries of ore by interests other than the Steel Corporation, this percentage fell off slightly. If the ore which is known to be at greater depths than is fixed by the state tax commission, were included in the estimate of the contents of the Michigan ranges, he said, the Steel Corporation's percentage would be lessened considerably. Dr. Leith testified that owing to the difference in geological formation of the deposits in the various ranges, it is easier to calculate the extent of the reserves on some of the ranges than on others. Thus, it is possible to measure holdings on the Mesabi range with accuracy. It is not possible, however, accurately to measure the old range ores. Indications, however, are that the reserves on the old ranges are far greater than was originally supposed. In fact, said Dr. Leith, the known contents of the Michigan ranges have been increasing constantly, despite the fact that shipments also are increasing largely each year.

Field is Wide Open

The witness said that it would be easy for any steel company to secure reserves totaling more than 100,000,000 tons, due principally to the fact that recent explorations have uncovered large new deposits. There are also known to be many hundreds of millions of tons of lower grade ores, which are available for use. In the Huronian series, in the old ranges, he said, it is estimated that there are at least 2,000,000,000 tons of ore having an iron content of 45 per cent.

The extent of the ore deposits in Brazil was next taken up by Dr. Leith. He stated that in the capacity of consulting engineer for the Brazilian Iron & Steel Co. he has become familiar with Brazilian ores, having visited the Brazilian ore region in 1910 and having since studied reports of surveys in that region. The Brazilian iron ore district, he said, is at present served by one railroad, while two other railroads having coast connections are about to be extended to the ore fields. Most of this ore, he said, is hard and specular; a portion of it is soft ore. The larger part is of Bessemer grade. The ore is better on the average than Lake Superior ores, running about 68 to 69 per cent in metallic content and being low in phosphorus. Four billion tons, said Dr. Leith, is a conservative estimate of the deposits in Brazil.

The cross-examination of the witness was conducted by Henry C. Colton, of government counsel. Mr. Colton asked Dr. Leith to name the va-

nious properties which he had in mind when he stated that 100,000,000 tons of ore were available for purchase. The witness named the holdings of the Breitung interests in the Marquette district which he said contained upward of 5,000,000 tons; two properties in the Crystal Falls district, containing approximately 1,000,000 and 8,000,000 tons, respectively, and two large holdings on the Cuyuna range. One of the latter, he said, was controlled by the Northwestern Improvement Co., with which concern he is connected in the capacity of consulting engineer. When pressed to give the extent of this holding, Dr. Leith stated that because of professional reasons he was unable to go into the matter more definitely than to say "several tens of millions of tons". The witness admitted that most of these deposits have been developed since the government filed its suit against the Steel Corporation in 1911.

The next witness was Geo. P. Crosby, of Duluth, who gave his profession as an explorer of iron mines. For many years, he said, he conducted explorations on the Mesabi range and during the past eight years has been active on the Cuyuna range. Mr. Crosby stated that he owns property on both the north and south ranges and that this is for sale at a reasonable price. He does not expect, he said, to operate furnaces himself. A large part of the Cuyuna range is unexplored, said Mr. Crosby. The ore bodies found on the range up to the present total about 435,000,000 tons. In addition, there are about 25,000,000 tons or more of manganiferous ore on the range. In the mines, which are now shipping ore on the Cuyuna range, there are 100,000,000 tons or more. The average metallic content of this ore is 56 or 57 per cent.

Protects His Clients

In cross examination by Henry C. Colton, government counsel, Mr. Crosby was asked to give a list of the properties on the Cuyuna range, together with their contents. In this manner the government attorney wanted the witness to account for his estimate of 435,000,000 tons, which he said is the extent of the known ore holdings on the Cayuna range. The witness, however, refused to give such a list of properties.

"If I would give out to the world a list of the properties on the Cuyuna range and the amount of the ore in each of them, it would not be long before I would be unable to get anyone to do business with me on the range," said Mr. Crosby.

"Then you refuse to answer because of professional reasons?"

"Yes, that's it," said Mr. Crosby.

Chester E. Tripp, president of the Rogers-Brown Ore Co., was thereupon called to the stand to corroborate Mr. Crosby's testimony. Mr. Tripp testified that the known merchantable ore deposits in the Cuyuna range amount to more than 500,000,000 tons. The greater part of the range, he said, still remains to be explored.

Carl Zappfe, Brainerd, Minn., engaged in exploration work on the Cuyuna range for the Northern Pacific railroad, took the stand Thursday morning. He was questioned by David A. Reed Jr., of counsel for the defense.

Mr. Zappfe testified that the known iron ore reserves on the Cuyuna range at present total about 400,000,000 tons. This, he said, does not include the deposits of manganiferous ore. There is reason to believe, said Mr. Zappfe, that the Cuyuna range contains a great deal more ore than is indicated by this figure, as much of the range is still unexplored.

Tests Are Borne Out

In cross-examination, Henry C. Colton, of government counsel, tried hard to shake Mr. Zappfe's testimony. The latter explained the method of exploring ranges which is employed on the Cuyuna range. This consists of drilling cross-sections 300 feet apart. The government attorney wanted to know if it were not possible barren rock and not ore lay between the cross-sections thus drilled. The witness said that this could not be the case, as underground operations subsequently prove that the estimates based on the indications of the cross-sections are approximately correct. Mr. Zappfe mentioned several mines in which underground operations verified that the ore lay as was indicated by the cross-sections. One of these was the Barrows mine. In exploring this mine three cross-sections, 300 feet apart were taken, and these showed that there was 600 feet of ore. Since the mine has been developed, the results of the exploration work have been proved correct.

More Ore is Discovered

The next witness was William N. Merriam, Duluth, Minn., who is geologist for the Steel Corporation's subsidiary, the Oliver Iron Mining Co. Mr. Merriam declared that since the publication in 1911 of the Michigan state tax commission's report, the extent of the known ore deposits in that state has been materially increased by the discovery of new bodies. In this report, which was compiled by J. R. Finlay, of the tax commission, said the witness, the depth of the ore in the various bodies was established arbitrarily as the depth of the lowest working level plus 100 feet. It has been shown, said Mr. Merriam, the ore runs much deeper than this in most cases, and if the ore at these greater depths had been taken into consideration Mr. Finlay's estimate would have been vastly greater. Mr. Merriam said if the ore at deeper levels were taken into consideration, as well as the ore which has since been located, the Steel Corporation would be found to control a much smaller percentage of the Michigan ore reserves than was indicated in Mr. Finlay's report.

Brazil Ore is Valuable

Mr. Merriam said that he has made two journeys to the ore regions in Brazil, one in 1910 or 1911 and one two years before that. On the latter trip he spent two months, on horseback and afoot, making estimates of the quantity of ore and the character of the Brazilian deposits. He found the ore in places has a metallic content of 69 per cent and more. He estimated that the Brazilian deposits contain about seven or eight billion tons of ore. Of this about one-fourth runs from 68 to 69 per cent in metallic content. The phosphorus content of the highest grade ore in Brazil, he said, is about 0.015 per cent. The deposits are of sedimentary origin, he said, and run to great depths. His analyses were made from ore taken from a depth of 1,200 feet below the outcrop. This ore, he said, would be worth about $7.65 at any eastern blast furnaces, such as those at Bethlehem.

In cross examination, Judge Jacob M. Dickinson, of government counsel, forced the witness to admit that he had explored the Brazilian ore deposits only along the sides of the deposits, and had not touched the ore in the interior of the deposits. The government attorney, therefore, objected to Mr. Merriam's estimates on the ground that he had depended largely upon supposition and upon what other people had told him in forming them.

Mr. Merriam was then questioned regarding his statement to the effect that iron ore may be mined successfully to a depth of 6,000 feet. He mentioned several mines in the Lake Superior district where underground operations extend to considerable depths. He admitted, however, that he was not a mining engineer and had based this testimony largely on the statements of other people. The government attorney then objected to Mr. Merriam's testimony regarding

the depth at which it is feasible to mine ore.

Mr. Merriam was also cross examined on his statement that many millions of tons of high grade ore on the Cuyuna and Mesabi ranges were for sale. The government attorney asked the witness to name the properties he had in mind, the contents of each and the analysis of the ore in each. Mr. Merriam said that it was a matter of general knowledge that certain properties were for sale and he admitted that he had never conducted negotiation for their purchase. He knew the extent of their contents only from what he had read and heard, and said that for the analyses of the ore he depended on THE IRON TRADE REVIEW, which publishes seasonal reviews. The government attorney thereupon objected to Mr. Merriam's testimony in this connection on the ground that it had not been based on what he himself knew, but rather on what he had learned from other sources.

In answer to further questions by Judge Dickinson, Mr. Merriam stated that the entire ore in the Lake Superior district not tied up by operating companies, now amounts to about 600,000,000 tons. Of this amount, 250,000,000 tons is in the hands of the Hill interests. About half of the 600,000,000 tons, he said, is on the Cuyuna range. Mr. Merriam was asked to give the analyses and contents of ore in the various properties on the Cuyuna range. Made wary, however, by his previous experience in the cross examination, he said that he could answer this question only from information which he based on other sources than his own knowledge.

Mr. Merriam testified that of the ore on the old ranges in Michigan, as indicated in the report for 1911 of the Michigan state tax commission, the Steel Corporation controls 26 per cent. Were the ore which has since been discovered included in the calculation, said the witness, the Steel Corporation's percentage would be reduced to 22 per cent. Mr. Merriam said that the Corporation owns about 10 per cent of the low grade ores on the Mesabi range—that is, ores averaging down to 35 per cent in metallic content. The witness also testified that there were properties in 1901 outside of the holdings of the Steel Corporation in that year, which were capable of producing 6,000,000 tons a year. Some of these were only partially developed at the time and others, which have since been developed, were then available.

William J. Olcott, president of the Oliver Iron Mining Co., Duluth, then took the stand. Mr. Olcott testified that he was born in Detroit and that in 1868, at the age of six, he moved to Marquette and ever since has resided in the Lake Superior iron country. He graduated from the University of Michigan in 1883 as a bachelor of science and in 1884 as master of science. In 1885 he commenced work as assistant mining engineer at the Chapin mine. At this mine he was in sole charge of operations for seven months, while the chief engineer was in Europe studying foreign methods of mining. Mr. Olcott also acted as chemist. In 1887 he became chemist and engineer at the Ashland and Germania mines. In 1890 he became connected with the Penokee-Gogebic Consolidated Iron Co. as chemist and mining engineer. This company operated a group of six mines. Later on he was made superintendent of mines. In 1894 Mr. Olcott left the employ of the Penokee-Gogebic company and moved to Duluth to become general superintendent of the Oliver Iron Mining Co. In 1902 he became general manager of that company, in 1905 vice president and, on April 1, 1909, assumed his present office.

Mr. Olcott said that his whole mining experience on the old ranges has shown that mining operations may be carried down to almost any depth. The Chapin mine has been worked from 700 feet, in 1885, to 1,400 feet at the present time. The ore is still of the same quality, the vein is of the same thickness, and the capacity is as large. This mine is on the Menominee range. The Ashland mine, which had been worked to a level of 700 feet in 1887, has now been worked down to 1,200 feet, and the production and quality of the ore and the thickness of the vein continue the same. The mines of the Penokee-Gogebic company on the old ranges have been worked down to levels of about 1,400 feet, with like results. In fact, said Mr. Olcott, the prospects today for depth are considered better than they were 20 years ago, as far as the old ranges are concerned. Results have shown that the ore at low levels is present in the same quantity and quality as nearer the surface. All that is necessary to work the lower levels, he said, is the installation of heavier hoisting machinery and the expenditure of more money for fuel. The added cost per ton, however, is not appreciable. The lowest iron ore working in Michigan, he said, is at the Newport mine, where ore is being taken from a depth of 2,400 feet. The ore is of the same grade, the vein of the same width and the capacity as large as in former years.

Mr. Olcott said that if given sufficient time to carry on negotiations, say about a year, he could secure a supply of ore sufficient to yield 1,500,000 tons per year for 50 years. The ore bodies which he could secure control of for this purpose do not include any which are now owned by steel companies. Neither do they include the properties owned by the Longyear-Bennett and Hill interests, although these two groups of properties could easily be drawn on for a similar supply. The properties he had in mind, said Mr. Olcott, were scattered about on all of the different ranges, and he thought he could secure them on leases at royalties of 35 to 80 cents per ton.

"I was more conservative about the future supply of ore 20 years ago than I am now," said Mr. Olcott. "For instance, I figured then that the Norrie group, because of the geological formation there, would be exhausted in eight or nine years. The ore lay in a trough formed by a vein of quartzite and a dike of diorite, and I thought that when the bottom of the trough was reached the ore would be exhausted. But the ore was found to continue on the other side, below the meeting place of the quartzite vein and the dike, and the Norrie group is still being worked and there are indications that the ore will be taken out indefinitely. It is the same way with most of the other mines on the Gogebic range and the other old ranges."

Mr. Olcott said that it is just as cheap to acquire mines now as it was years ago. He said that he has come to the conclusion that the Baraboo, in Wisconsin, is not a range.

"There is a big reserve of water there, but not of ore. We have spent lots of money in exploring there, but have been very much disappointed. It is not a mining proposition.

The witness said that any attempt at monopolizing the ore reserves of the Lake Superior district into one company would only serve to stimulate activity in exploration work and that as a consequence the amount of known tonnage would be greatly increased.

C. C. Bradford, manager of the Cleveland office of the United States Light & Heating Co., New York, has been made sales manager of that company with offices in New York. R. B. Clark has been made acting manager of the Cleveland office. Mr. Bradford is a graduate of Case School of Applied Science, and has rapidly advanced since his graduation. Mr. Clark is also a graduate of Case.

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A Low Rate of Blast Furnace Construction

It is of particular interest to observe at this time, when the American iron and steel industry is threatened with important readjustments through the enactment of a tariff much lower than any that has prevailed since the industry reached anything like important proportions, that the rate of new construction has lately been, and now is, extremely low. In THE IRON TRADE REVIEW's summary of blast furnace construction, printed at the beginning of this year, the additions to capacity through the erection of absolutely new furnaces, was shown to have been in excess of a million tons of annual capacity in each one of the years 1905 to 1910, inclusive, while the average annual addition during the six years was 1,567,000 tons. In 1911 and 1912, on the other hand, the average was only 780,000 tons. This year's additions have been still less, and at the present moment there is hardly any new blast furnace construction outside of the Steel Corporation's new construction at Duluth, involving only two stacks.

Inasmuch as much more than a year is usually involved from the time of first conception to the actual making of pig iron, this condition is very significant. To double the output every 10 years, as used to be done, requires an annual increment of 7.2 per cent, and if new construction requires a year and a half there should be in progress at any one time, on the average, 10.8 per cent of new capacity, which on our present capacity, which is not less than 34,000,000 tons as an inside estimate, would involve 3,672,000 tons of annual capacity, and represent at least two dozen blast furnaces.

If we are passing through a lull in new construction, the lull has been in progress for some time, indeed for a period of about three years. If one take the viewpoint that the new tariff requires readjustments, or at least conservatism, we have been practicing the conservatism for three years. Even should a stupendous change for the better in the industry's prospects occur within a few months, we can hardly see new blast furnaces projected and built in time for making pig iron before Jan. 1, 1916, which means that for a period of five years our new construction will have been very light, not involving over 3,000,000 tons at the very outside, or an average of 600,000 tons a year, against an annual average of 1,567,000 tons in the six years preceding. Such an alignment ought to place the industry as a whole in very secure position against the most adverse developments from foreign competition, seeing that in no single description of product is the demand for iron and steel tending to grow less through the competition of any other material.

Worldwide Interest in Waterways

That agitation in favor of the improvement of waterways is not confined to the United States was shown at the recent meeting of the British Association for the Advancement of Science, in Birmingham, where the discussion as bearing upon the international traffic in iron and steel brought out some very interesting points. Recommendations for the improvement and unification of English waterways have been formulated recently by a royal commission. Parliament has not yet done anything in the matter, but a large number of local authorities and commercial organizations have formed themselves into a Waterways Association to press the recommendations on the government. The canals in the Midlands are largely the channels by which foreign iron and steel are taken inland, and, at the same time, inland manufacturers are hoping that an improvement of the canals, by cheapening the conveyance of heavy goods to the ports, will enable them to compete more successfully in outside markets.

The discussion brought out some striking comparisons of transport rates in illustration of the importance of canal development. It was shown that the French and Belgium rates give an immense advantage to the trader over English rates. Owing to the absence of effective canal competition with the railways, the British iron master is compelled to pay much more than his continental competitor. The total inland waterway traffic of England in 1905, one of the speakers stated, was 37,500,000 tons, about one-twelfth of that carried by the railways. The multiplicity of ownership of boats, the lack of uniformity of gage, the small capacity, the absence of co-operation

and organization, and the control by railway companies have rendered through traffic between industrial centers and the ports impossible.

A view different from that taken by the majority of those who spoke was expressed in a paper by W. M. Ackworth, a well-known commercial expert, who contended that canals cannot carry more cheaply than railways. He stated that in France and Germany canals competed successfully with railways because they were subsidized and a large part of their expense was met by the tax payers. "In England," said Mr. Ackworth, "where canals and railways have had to compete on equal terms, the canals have been beaten." He pointed out that in America many canals have been abandoned, and that even the Erie canal had lost its old importance. Mr. Ackworth's views met with little sympathy, as the feeling in favor of the revival and improvement of canals is at present very strong. Mr. Ackworth seemed to have overlooked entirely the building of the barge canal in New York and the agitation in many parts of the country for the expenditure of immense amounts of money in the improvement of rivers and harbors. Mayor Fitzgerald, of Boston, is a conspicuous example of men who believe that the nation ought to be very liberal in its expenditures for the improvement of waterways. He points out that under the new tariff law the United States must make a determined effort to take its place under competitive conditions in the commerce of the world, and he points out that the problem of abating floods on the Mississippi is not as difficult a solution as the building of the Panama canal. If, he argues, this nation can afford to spend $400,000,000 on the Panama canal, it can afford also to spend that amount on the improvement of its own waterways during the next few years.

As the benefits resulting from the use of the Panama canal become apparent, the agitation in favor of greater expenditures for waterways will increase, and probably one of the most important effects of the completion of the great Isthmian canal will be to arouse new interest throughout the world for the improvement of waterways.

Meeting New Conditions

Courage and determination to make the best of such conditions as may arise under the new tariff are being shown by some of the leading manufacturers who are hit the hardest by the new low tariff schedules, notably those making iron and steel products and cotton and woolen goods. The general disposition seems to be that no matter what the manufacturer's opinion may be as to the wisdom of the low tariff policy, he should now waste no time complaining, but should do the very best he can under the new conditions. In the iron and steel markets, interest is keenest on the Atlantic and Pacific coasts. Products of foreign furnaces and mills will find it easier to cater to the coast trade than to go inland. Freight rates would soon more than offset any advantage that the foreigner might have. To what extent consumers in the extreme eastern and extreme western parts of the country will be served by foreign manufacturers, it is impossible to predict, and whether the increase in imports proves to be great or not, the importance of American manufacturers making a determined effort to extend their field of activity to foreign lands is manifest and the outlook is that, to a greater extent than ever before, American products will be shipped to foreign lands. It is highly desirable that in extending the foreign trade neither the manufacturers in this country nor those of other countries will become so greedy and aggressive as to provoke retaliatory policies. Such a result would be disastrous to all concerned, especially to the workingmen.

Judge Gary's Optimism

Judge Gary is quoted in a newspaper interview as saying that during his vacation he has had time to think things over and is now much more hopeful as to conditions in this country, as he believes the public is beginning to see things in the right light. "The people," he says, "have passed through the hysteria that at one time threatened to be frightfully disastrous. We have abounding faith in the American people and believe that they will always recover from any undue excitement about political or other conditions." We believe that Judge Gary's remarks are due to his calm consideration of conditions during his vacation rather than to any important or sudden change that has taken place on the part of the people in this country. The fact is, however, that the bitter warfare against corporations and wealth in general has been gradually petering out. We agree with the judge that the saner view of things gives reason for increased hopefulness as to business conditions. He adds that with basic conditions good and in view of the present attitude of the administration, as he understands it, we have reason to be very hopeful of the business prospects. Basic conditions, financially, in all the great nations are not entirely satisfactory, but tremendous consumption of all iron and steel products continues and furnishes the most hopeful indication of sound conditions. The currency question in this country still remains to be solved, but there is fair promise that it will be worked out at a not far distant date. Then there ought to be pretty fair sailing for business.

The late T. Frame Thomson, whose tragic death came as a shock to his many American friends, was a man of rare ability. His business success began almost as soon as he left college, and he occupied very important positions at an early age. Perhaps his leading characteristic was his most unusual power of encouraging others. His own enthusiasm was contagious.

MEN OF THE IRON TRADE

ARTHUR C. PLETZ was recently appointed general manager of the Aurora Tool Wks., Aurora, Ind.

JOHN M. SHERRERD is now connected with the Stroh Steel Hardening Process Co., House building, Pittsburgh.

A. J. BAKER, associated with the Cincinnati Milling Machine Co., left recently for an extended trip through Europe.

FRANK C. B. PAGE, vice president of the E. W. Bliss Co., Brooklyn, N. Y., recently left on a business trip through Europe.

S. J. GREEN, formerly sales manager of the Gibson Automobile Co., Indianapolis, recently joined the Emil Grossman Co. as sales manager.

RICHARD PETERS JR., formerly associated with the Birmingham Coal & Iron Co., Birmingham, Ala., now is connected with the W. J. Rainey coke interests at Uniontown, Pa.

CHARLES W. ALLEN, formerly associated with the L. J. Bordo Co., Philadelphia, was recently elected manager of the railway department of the Reading-Bayonne Steel Castings Co.

COL. H. P. BOPE, vice president of the Carnegie Steel Co., who was operated upon at New York City recently, continues to steadily improve. He has been able to be moved from the sanitarium where he was operated upon to one of the hotels, and it is now expected that his condition will warrant his return to Pittsburgh in about a week.

CHARLES E. HULICK, superintendent of the Saucon furnaces of the Thomas Iron Co., at Hellertown, Pa., since 1903, has been promoted to superintendent of the Hokendauqua furnaces at Honendauqua, Pa.

F. A. WILDES, Hibbing, Minn., chief inspector of iron mines for the state of Minnesota, is ill at St. Mary's hospital, at Rochester, Minn., with stomach trouble. An operation will probably be necessary.

JAMES DUANE JR., who has been superintendent of the Midland plant of the Pittsburgh Crucible Steel Co., Midland, Pa., for several years, has been appointed superintendent of the Saucon furnaces of the Thomas Iron Co., at Hellertown, Pa., and takes charge immediately.

H. H. LECKLER, formerly a member of the engineering staff of the International Harvester Co., was recently appointed mechanical engineer of the Emil Grossman Co., New York City. Mr. Leckler was, at one time, connected with the engineering departments of the Winton and F. B. Stearns companies.

W. C. McKEE, has resigned as superintendent of blast furnaces, Inland Steel Co., Indiana Harbor, Ind., to become general superintendent of the Thomas Iron Co., in charge of blast furnace plants at Hokendauqua, Hellertown, Alburtis and Island Park, Pa. Mr. McKee has made his headquarters at Hokendauqua.

M. L. JOHNSON, who has had charge of the order department of the Ohio Steel Foundry Co., Lima, O., for three years, has resigned, effective Oct. 1. He has interested himself in the Crucible Casting Co. of the same city, and will be secretary and treasurer. Other officers are: President, B. F. Thomas; vice president and general manager, Guy S. Rinebolt.

JAMES W. SMITH, general manager of the American Steel & Wire Co.'s plant at Trenton, N. J., has resigned to become general superintendent for the Wyman & Gordon Co. Harry G. Stoddard, formerly president of the Trenton Iron Co., now the American Steel & Wire Co., is vice president and general manager of the Worcester company. The Trenton plant is to pass under the management of the Pittsburgh district of the Steel Corporation and will be in charge of G. W. Jewett, Pittsburgh, and Jay Waldeck, assistant manager of the Pittsburgh district, will be in direct personal charge.

TRADE NOTES

ALIQUIPPA, PA. — An attempt is being made to reorganize the Kidd Bros. & Burgher Steel Wire Co., which has been in the hands of a receiver the past three years.

BRACKENRIDGE, PA.—A consignment of steel sheets made by the West Penn Steel Co., will be among the early shipments through the Panama canal. A large order being filled for shipment to San Francisco has been going by rail, but the next shipment will be via the canal.

CANAL FULTON, O.—The Fulton Drop Forge Co. advises it will take over the assets of the Fulton Machine & Forging Co., bankrupt. No new building is to be done.

CHICAGO.—The American Steel Foundries recently moved its local offices from the Commercial National Bank building to the McCormick building.

DETROIT.—It is announced that the M. & S. Gear Co. plans to move its plant to Detroit. The company recently took offices in the Dime Bank building pending arrangements to the establishment of its plant.

ELWOOD, IND.—The Elwood Iron Works Co. has voted to cancel its preferred stock and issue $200 000 in common stock in lieu of it.

EVANSVILLE, IND.—Operations are to be started at once at the factory of the Faultless Caster Co. Machinery is practically all set up and ready to run. Rivets will be part of the product.

GRUNVILLE, N. C.—Southern headquarters for the sale of transmission equipment and shafting by the Jones & Laughlin Steel Co. are to be established here. Milton G. Smith to be in charge.

LOWELLVILLE, O.—A new clubhouse is being built by the Ohio Iron & Steel Co. for employes and will be ready for occupancy by the middle of the month. It is two stories, of brick, and well equipped.

MIDLAND, PA.—The annual meeting of the stockholders of the Treadwell Construction Co. was held here last week, and the following officers and board of directors were elected: M. H. Treadwell, president; Sam N. Craig, vice president; H. N. Dougherty, treasurer; J. H. Killinger, R. M. Dorsey, John S. Craig and A. K. Hamilton.

MILWAUKEE.—The Milwaukee Oil Pump & Tank Co. has filed a petition of voluntary bankruptcy, liabilities $8,026.23 and assets $7,717.31.

MILWAUKEE.—The Smith & Post Co., 1125 Thirty-second street, Milwaukee, has changed its corporate title to the Smith Engineering Works and increased capital from $100,000 to $200,000. Extensions to care for increasing business are being outlined.

MILWAUKEE.—The entire office and executive force of the Chicago works of the Allis-Chalmers Mfg. Co. was transferred to the West Allis main works in Milwaukee, on Oct. 4. Two hundred and fifty persons are affected by the change, which is the first step in the consolidation of all Allis-Chalmers works in Chicago and Milwaukee districts at West Allis. The operating department will be moved later in the year, when the new shops now under construction are completed. The buildings consist of a boiler, flange and perforating shop.

NEW YORK CITY.—The Hamery Tool & Machine Co. has increased its capital from $50,000 to $2,000,000.

PHILADELPHIA.—A booklet marking the completion of its 40,000th locomotive has been issued by the Baldwin Locomotive Works, Philadelphia. The plant was established in 1832 and in 1861 No. 1,000 was built. In 1880 No. 5,000 was reached, in 1889 No. 10,000, in 1902 No. 20,000, in 1907 No. 30,000.

READING, PA.—The Columbia Cutlery Co. has filed a notice of decrease of stock from $60,000 to $40,000.

TOLEDO, O.—New directors and officers of the United States Malleable Iron Co., were elected at the annual meeting of stockholders held recently. The new board of directors is composed of Albert Neukom, E. C. Hagener, P. J. Kranz, D. A. Yoder, Clark A. Browning, R. G. Bacon and John Lloyd. Officers are: President, Albert Neukom; vice-president, D. A. Yoder; secretary, P. J. Kranz; treasurer and general manager, E. C. Hagener. A quarterly dividend of one and one-half per cent was declared, payable in October. General Manager Hagener made a report showing a good business during the past year and announced two additions have been added to the plant in that time.

TOLEDO, O.—The Jos. L. Skeldon Engineering Co. reports better business during the last 10 days of September and the first week of October than has been had throughout the year. The orders are not particularly large in character but include pumps, boilers, etc., for factories, many of which seem to be adding to their equipment and improving their plans generally. Among the recent orders secured by this concern are the following: A 1,000-gallon motor-driven Underwriters fire pump, including Westinghouse motor; American Well Works centrifugal pump. Cutler-Hammer control, for the Owens Bottle Machine Co.'s Fairmont, W. Va., plant. This concern has also closed a contract with the Peters-Eichler Heating Co., of St. Louis, Mo., for two new 100 h-p. boilers to be used in the new Kenton, O., court house; a new double acting motor driven drop well power head for the new plant of the Paige Dairy Co., Toledo, $3,000; new double acting American drop well motor driven power head for the Toledo plant of the Owens Bottle Machine Co.

WATERLOO, IA. — The Waterloo Sheet Metal Co., Waterloo, Ia., formerly a partnership by Hanson & Eldredge, is now owned by F. G. Eldredge, has resumed operations after being closed by an attachment issued in the absence of the owners.

NEW BUSINESS

In New York, there has been a slight improvement in the volume of small orders booked in the machinery market during the past week. The market, however, was entirely devoid of events of importance. No new large inquiries were circulated during the week. The General Electric Co. made a few purchases and the Pennsylvania railroad put out a few orders against a list issued some months ago.

In Pittsburgh, machine tool builders continue to complain about the lack of snap in buying, and sales the last couple of weeks have been light. Whether final passage of the new tariff law will remove some of the uncertainty that has characterized the trade this year is a question. Builders of heavy rolling mill machinery have a large volume of orders on their books and will operate plants at practically maximum capacity for three or four months more.

In Chicago, business men are in a cautious mood and conditions are not right for heavy sales of machinery. The machine tool trade during September was fairly satisfactory and showed a slight increase over August. Dealers still hope that conditions will improve before winter sets in. Sales of electrical machinery and power transmission apparatus are more encouraging than some other lines.

In Cincinnati, with the probable exception of one maker of machine tools, that branch of the machinery trade is very dull. It would be safe to say that with this one exception the machine tool makers in Cincinnati are not operating over 60 per cent of their capacity. Orders are mostly for single tools and are about equally distributed between domestic and foreign business. Railroads are showing no tendency to buy, although it is known that several of them are in need of tools. Makers of special machinery such as laundry machinery, etc., are fairly busy and have been for some time. Small electrical equipment is selling fairly well and has probably improved a little since last summer. Second hand machinery is still dull in that there is very little demand for it in this territory at the present time.

ALABAMA

ALABAMA CITY.—The city plans to install a water-works system estimated to cost $26,500. Address Charles West, city clerk.

OZARK.—W. D. McNeill of this city and associates are planning to build a cotton mill to contain 5,000 spindles. Estimated cost $100,000.

ROANOKE.—The city plans to install a water-works system estimated to cost $40,000.

CALIFORNIA

HERCULES. — The Hercules Powder Co. recently purchased 2,200 acres, upon which it plans to erect a plant to cost about $1,000,000 when equipped.

REDDING.—The Benton Lumber Co. recently purchased a site here, upon which it plans to erect a plant estimated to cost $25,000.

CONNECTICUT

ANSONIA. — The Ansonia Electrical Co. advises one floor of its added space will be used for storage and the other for manufacturing. Machinery for the latter will consist of special devices being built to order, motors, line shafting, and fittings, and braiding machinery.

NEW HAVEN.—The Bavier Mfg. Co. has been incorporated to make hardware, machinery, etc., with a capital stock of $25,000.

STAMFORD.—The Richards Artificial Leather Co. plans to erect two buildings. Plans call for a 55 x 110-foot two-story building and a 49 x 114-foot one-story building of brick construction.

DISTRICT OF COLUMBIA

WASHINGTON.—Bids will be received Oct. 19 by navy department bureau of yards and docks for structural steel work for coaling station at Pearl Harbor. Steel will cost $350,000.

FLORIDA

CARTERS.—The sawmill of Carter Bros. was damaged by fire recently. Estimated loss $50,000.

HIGH SPRINGS. — The citizens recently voted in favor of the issuance of a $35,000 bond issue for the construction of an electric light plant and water-works.

PALATKA.—The Wilson Cypress Co. recently started work on a planing mill 92 x 210 feet.

PALATKA.—The Stanton Foundry & Machine Co. plans to erect a two-story, 30 x 60-foot addition to its machine shops. Lathes, planers, etc., for steel, iron, brass and copper will be required.

PENSACOLA. — County commissioners plan to erect a $100,000 bridge across the Escambia river near here.

ST. ANDREWS.—Bids will be received until Oct. 28 for the construction of three bridges in this city. Address the mayor.

IDAHO

BOISE.—A commission has been appointed to prepare plans for a steel span bridge across Snake river, in Bonneville county, connecting Idaho and Wyoming.

COUER D'ALENE.—Work will begin about Jan. 1 on new Rutledge mill plant that will cost $1,000,000.

ILLINOIS

CHICAGO. — The Universal Auto Supply Mfg. Co. has been incorporated; $50,000; by C. S. Tuttle, G. Burke and J. D. Iroz.

CHICAGO.—The Mutual Electric Mfg. Co. has been incorporated; general contracting business; $350,000; by S. I. Babcock, J. Johnson and M. Luce.

CHICAGO.—The Calumet Baking Powder Co. recently began construction work on a 100 x 260-foot five-story building. Estimated cost, $250,000.

CHICAGO.—John Kelly, of this city, plans to erect a two-story brass foundry. Plans call for a structure 54 x 134 feet, estimated to cost about $15,000.

CHICAGO.—The Johnston & Chapman Co., metal perforator, has bought a site on Carroll avenue, near Sacramento avenue, on which to build a plant at a cost of $25,000.

CHICAGO.—The Northwestern Electric Castings Co. has been incorporated, machinery, electric appliances, etc.; $10,000; by H. V. Shepard, H. W. Lewis and W. T. Church.

CHICAGO. — The Charles H. Kellerman Foundry & Machine Co. is about to build a 7-story building at Erie and Kingsbury streets for manufacturing and warehouse purposes, at a cost of about $115,000.

CHICAGO.—The Empire Iron & Steel Co. has leased for 25 years a site at Thirty-sixth and Morgan streets on which a mill-construction building of one and two stories 46 x 350 feet will be built.

GALESBURG.—The plant of the Galesburg Malleable Iron Co. was damaged by fire Sept. 28, loss $10,000.

ROCK ISLAND.—The Rock Island Mfg. Co. advises it has just completed an addition to its foundry, doubling floor space, and a two-story building 50 x 110 feet for storage. In the foundry addition a cupola, tramway system and considerable other equipment have been added.

INDIANA

AURORA.—The Royer Steel Mfg. Co. has been placed in the hands of a receiver following a suit against this company by Steven H. Wilder, of Cincinnati. Joseph C. Small, of Aurora, has been appointed receiver.

BOONVILLE.—Howard Taylor has been put in charge of the manual training department of the city schools and will purchase any equipment needed for that character of work.

CRAWFORDSVILLE.—The American Motor Wheel Co. has been incorporated to manufacture automobile trucks and motors; $600,000; by W. H. Owen, S. C. Rowland and J. V. Wilson. The company plans to establish a factory in the near future.

EVANSVILLE.—The plant of the Monarch Broom Co. was partially destroyed by fire, the loss being $10,000. The company will replace the lost equipment.

IOWA

DAVENPORT.—Reconstruction of the foundry of the Red Jacket Mfg. Co. has been begun. Fire damaged the structure recently.

KANSAS

McPHERSON.—The plant of the Bellefontaine Foundry & Machine Co. has been bought by the Humphrey Pipe & Foundry Co. and the latter concern will occupy the buildings in the spring.

OXFORD.—A $20,000 bond issue was re-

Grey Iron Castings

We need contracts to make 20 tons more per day, to reduce the cost of production. Our capacity is 50 tons a day; size from 100 pounds down. Willing to work on a very close margin—get our prices.

THE DUNHAM COMPANY
Mfs. of Agricultural Implements
Berea, Ohio

cently voted for the improvement of the water works system.

KENTUCKY

DANVILLE.—The construction of a new pumping station has been decided on by the city council and the contract for the building and machinery will be let shortly. Address Mayor Wallace.

DAWSON SPRINGS.—The New Century Hotel Co. will need boilers for a large bath-house which it is erecting. Frank M. Fisher, Paducah, Ky., may be addressed.

LEXINGTON.—The Union Storage & Redrying Co., which has been incorporated with $20,000 capital stock, will need boilers and other equipment. J. L. Watkins is president of the concern.

LOUISVILLE.—The Big Creek Coal Co. has been incorporated to develop 4,700 acres; $175,000; by D. W. Gatlin, H. E. Tuley, F. C. Bailey and I. Bailey, Louisville.

LOUISVILLE.—The Dow Wire & Iron Works has begun the construction of an addition to its foundry. It states that little or no new equipment will be required.

PADUCAH.—The Lack Malleable Iron Co. is erecting additions to its foundry.

PADUCAH.—The city council is considering the erection of a new pumping station and will probably authorize an appropriation for that purpose in the near future.

PAINTSVILLE.—The city contemplates the installation of a water-works system estimated to cost $50,000.

STURGIS.—George B. Simpson, Jr., will purchase a freight elevator for installation in a new mercantile building the construction of which has been begun.

WINCHESTER. — The B. F. McCormick Lumber Co. plans to enlarge the capacity of its planing mill by the installation of additional machinery.

MAINE

PORTLAND.—The plant of the W. A. Allen Co., manufacturer of finished lumber, was recently damaged by fire, entailing a loss of $10,000.

MARYLAND

BALTIMORE.—The City Baking Co. recently completed plans for a 107 x 120-foot addition estimated to cost $100,000.

MASSACHUSETTS

BOSTON.—The Baker-Tarbett Co. has been incorporated; machinery; $15,000; by A. Tarbett and A. F. Baker.

BOSTON.—The Overland Automobile plans to erect a four-story brick and concrete service building in the near future.

BOSTON.—The Harding Specialties Co. has been incorporated; machinery; $50,000; by W. W. Harding, T. J. Graham, H. W. Sprague.

BOSTON.—Henry T. Ripley, Inc., has been incorporated; iron and steel; $50,000; by H. T. Ripley, R. R. McNamee and J. Cavanaugh.

BOSTON.—The S. & A. Mfg. Co. has been incorporated; machinery; $10,000; by F. L. Stucliffe, A. D. Adams and A. E. Roberts.

BOSTON.—The Cambridge Brass Co., 69 Sudbury street, has leased manufacturing space in Medford, Mass., for a plant to manufacture gas and electric light fixtures.

EAST SPRINGFIELD.—Additions are being planned by the Stevens-Duryea Co. to its plant at East Springfield. Capacity will be more than doubled.

LOWELL.—The Harvard Brewing Co. plans to erect an addition 76 x 106 feet, two stories, estimated to cost $50,000.

TEMPLETON. — The Otter River Board Co. plans to erect three buildings. Plans call for a brick factory 68 x 134 feet, one story, boiler house 55 x 75 feet, two stories, and an addition 22 x 50 feet.

WORCESTER.—The White, Pevey & Dexter Co. is to build 36 x 53 feet, two stories, brick, to cost $6,000, for use as boiler house, carpenter shop and machine shop.

Woodmansee & Davidson, Inc.
ENGINEERS
All Kinds of Power Plants
SPECIALISTS in the Industrial Application of PRODUCER GAS
MILWAUKEE Wells Bldg. **CHICAGO** 1st National Bank

MICHIGAN

BAY CITY.—The DeFoe Motor Boat Wks. recently completed plans for a 100 x 120-foot frame structure.

DETROIT.—The Progressive Forge Co. advises its capital is $100,000 and it is formed to manufacture drop forgings. A three acre site has been bought and a modern plant is to be put up at once. Officers are: President, A. Johnson; vice president, M. C. Hechner; secretary-treasurer, L. A. Rosier.

LUDINGTON.—The H. M. Hallett Co. plans to erect a plant. Estimated cost of buildings and equipment $100,000.

MINNESOTA

FORSYTH. — L. A. King of Pipestone, Minn., recently purchased a site here, upon which he plans to erect a flour milling plant.

MISSOURI

ST. LOUIS.—The Commercial Foundry Co. recently started work on a new building estimated to cost $10,000.

ST. LOUIS.—The Halsey Automobile Co. plans to erect a three-story, 100 x 150-foot reinforced concrete building estimated to cost $100,000.

MONTANA

BUTTE.—The Chicago, Milwaukee & St. Paul railway recently completed plans for the erection of a $200,000 depot here.

GREAT FALLS.—President Wm. A. Baehr, Chicago, of the Great Falls Gas Co., says company will lay two miles of gas mains at once.

MISSOULA.—Walter F. Hennigsen, manager Montana Creamery, says company will build a new plant.

SALTESE.—Articles of incorporation have been filed by the Wilson Mining & Smelting Co.; $200,000; by Wm. Burke and others of this place.

NEBRASKA

OMAHA.—Construction has been started on a machine shop to cost $15,000 for the Hoeschen Mfg. Co., Omaha.

NEW JERSEY

EAST ORANGE.—The A. P. Smith Mfg. Co. recently completed plans for a two-story concrete addition, 70 x 115 feet.

JERSEY CITY.—Colgate & Co. plans to erect a one-story brick addition estimated to cost $18,500.

NEWARK.—The Choloner Co. has been incorporated; mechanical inventions; $25,000; by G. C. Hirst, E. L. Hirst, E. P. Hirst and H. W. Hirst.

NEW YORK

BROOKLYN.—The Farrell Valve & Specialty Co., Inc., has been incorporated; valves and faucets; $25,000; by H. C. Farrell and M. B. Casler, Buffalo.

BROOKLYN.—The American Machine & Foundry Co. recently purchased a site and plans to erect a three-story brick factory and power-house.

BROOKLYN. — The Handy Wire Goods Co., Inc., has been incorporated; manufacturing, $30,000; by F. A. Curran, 346 State street, J. T. Rosengren, 46 St. Marks place and T. N. Burke, 383 Atlantic avenue, Brooklyn.

BUFFALO.—The plant of the Clover Milling Co. was recently damaged by fire entailing a loss of $50,000.

HORNELL.—The Swift Machinery Co. recently completed plans for a factory 50 x 80 feet.

LANCASTER.—The American Malleable Co. recently increased its capital from $500,000 to $1,000,000. The company's plans for enlargement call for an expenditure of $200,000.

MANHATTAN.—The Gallatin Iron & Steel Co., Inc., has been incorporated; iron and steel; $20,000; by Frank Cornell, D. Grant and G. W. Corbin, Newburg.

NEW YORK CITY.—The Packard Motor Co. plans to erect a one-story addition to its plant here. Plans call for a brick and concrete structure, 89 x 227 feet, estimated to cost $40,000.

SYRACUSE. — The Quaint Art Furniture Co. recently completed plans for a factory. Plans call for a three-story building, 57 x 252 feet, estimated to cost $60,000.

SYRACUSE, N. Y.—The Van Wie Pump Co., Syracuse, N. Y., has increased its capital from $50,000 to $75,000 and will increase its equipment.

NORTH CAROLINA

WEST RALEIGH.—The Agricultural and Mechanical College plans to erect a shop building estimated to cost $46,000.

OHIO

BELLEVUE.—The Hoover Mfg. Co. plans to increase its manufacturing facilities.

CANAL FULTON. — The Fulton Drop Forge Co. has been incorporated; $100,000; by W. C. Laiblin, C. A. Erwin, H. D. Pownall, W. Staurt and A. M. McCarthy.

CINCINNATI.—The Lunkenheimer Co. is having plans prepared for the erection of an iron foundry estimated to cost $200,000.

CINCINNATI.—Bids will be opened Oct. 13 by V. T. Price, director of public service, for two direct connected steam turbine generators for use in the water-works plant.

CINCINNATI.—A small amount of light electrical equipment will be required by the Davis Dairy Machinery Co. for its new plant at Bank and Patterson streets, which it has just leased and which it will occupy within the near future.

CINCINNATI.—It is rumored that the J. A. Fay & Eagan Co., manufacturer of woodworking machinery, is contemplating moving its plant to Indianapolis. It is understood that this firm is negotiating for 60 acres in Beech Grove, a suburb, which will cost about $170,000. Officers of the company refuse to either deny or affirm this report.

CINCINNATI. — Architects Robertson & Fahnestock have let the general contract for the new plant of the Gedge-Gray Co. to be built on Hosea avenue, Lockland, a suburb of Cincinnati, to Butler Bros., of Glendale, also a suburb. The Gedge-Gray Co. is at present operating in Hamilton, O., but will move to Cincinnati as soon as its new building is completed.

CINCINNATI.—In connection with the sale of the chattels of the Schacht Motor Car Co., on Oct. 20, John F. Dietz as receiver has recommended the sale of the real estate to be scheduled for Nov. 6. The real estate has a valuation of about $26,000 and the sale of it will have no connection with the disposal of the chattels. The plant is located at 2727 Spring Grove avenue.

CINCINNATI.—The American Oil Pump & Tank Co. has been incorporated; $25,000; to manufacture and deal in oil machinery. The company is at present operating a plant in Dayton, O., but will move it to Cincinnati as soon as a suitable location can be secured and the business in the future will be carried on from Cincinnati. A. C. Davis, S. F. Kemper, H. H. Kemper and W. A. Knight, incorporators.

CLEVELAND.—The Ohio Foundry Co. is to erect an addition to its plant, 7608 Quincy avenue, for an assembling building.

CLEVELAND.—The Chandler & Price Co. plans to soon begin construction work on two brick and steel four-story buildings, 33 x 76 feet and 41 x 125 feet.

CLEVELAND.—The Grant Bros. Co., manufacturer of automobiles, plans to erect a manufacturing plant here, a site for which is now being sought.

CLEVELAND.—The Remo Pipe Cleaner Co. has been incorporated; pipe cleaning machines; $25,000; by G. E. Meyers, M. J. Roan, E. F. Smith, J. W. Willidis and W. McMahon.

CLEVELAND. — The Cleveland Power Equipment Co. has been incorporated; $1,000; by H. W. Diebolt, L. S. Garrett, C. Gottwald, Z. O. Diederich and H. W. Tucker.

CLEVELAND. — The Cleveland Wrought Washer Co. is building an addition to its plant at 3590 West Fifty-eighth street, to cost $7,000.

CLEVELAND.—Fire Oct. 5 burned out the plant of the Weber Brass Co., Walnut avenue and East Twelfth street. The company was engaged in the manufacture of ornamental brass work.

CLEVELAND.—The Brooklyn Brick Co. is rebuilding the brick plant on Valley road formerly owned by F. Eggers, and the equipment has been bought, most of it being in operation. Common brick will be the only product for some time.

CLEVELAND.—George S. Rider & Co., architects, have completed designs for a factory building for the Cleveland Heater Co. and the Cleveland Speedometer Co. It will be 100 x 250 feet, sawtooth, brick and steel, metal window frames and sash and metal doors, to cost about $40,000. The Forest City Steel & Iron Co. has the contract for the steel and the Walter I. Thompson & Son Co. the general contract.

DAYTON.—The Excelsior Laundry Co. recently completed plans for a three-story, 62 x 122-foot building estimated to cost $30,000.

DAYTON.—Final report has been filed by

Referee W. S. McConnaughey in the bankruptcy matter of the Ohio Sterling Co., manufacturers of meters and foundry supplies, of Dayton, O., closing the case. The report shows that the liabilities of the company aggregated $235,965.26. The assets realized amounted to $85,040, of which $12,887.50 was paid to unsecured creditors holding claims aggregating $167,290.12. Secured creditors received $49,462.39.

GENEVA.—The Champion Hardware Co. plans to enlarge the old electric lighting building on Factory row, which it recently purchased to use as a foundry.

LIMA.—Henry Enck, of Lima, has secured the contract for the Spencerville road bridge at his bid of $735. The Capital Construction Co., of Columbus, O., secured the contract for the Children's Home bridge, awarded at the same time at its bid of $5,510.

MASSILLON.—The Massillon Foundry & Machine Co. has increased its capital from $100,000 to $200,000.

TIFFIN.—Plans have been approved by the city council for a $300,000 river improvement project to protect the city from flood danger. The plans include the widening of the river channel to a uniform width of 250 feet and constructing drives along the banks. The matter will be voted on by the people. Two concrete bridges are replacing those carried away by the March flood and a third one will be built within a year.

TOLEDO.—The Radial Mfg. Co. has been incorporated; milk machinery; $10 000; by R. Fuller, J. H. Taylor, R. A. Hines, C. S. Coup and R. A. Hayes.

TOLEDO.—The Willys Overland Co. announces it has bought the plant and business of the Globe Ball Bearing Co., Norwich, Conn. The machinery is being removed to Elmira, N. Y., to be set up in connection with the Morrow Co., another subsidiary of the Overland company. This is a step toward providing facilities for making all parts of the Overland automobile by one company.

TOLEDO.—William L. Vail has been appointed receiver of the Automatic Machine & Tool Co., 369 Erie street, by Judge Manton. The application for the appointment of a receiver was made by Wright, Russel & Bay Co., of Toledo, in an effort to recover on a judgment of $111.16. The applicant alleged that the assets of the Automatic Machine & Tool Co., amounted to $20,000 and the liabilities to $25,000.

OKLAHOMA

TULSA.—The Oklahoma Iron Works has bought the plant of the American Well Prospecting Co., Bartlesville, Okla., making the third branch plant established recently.

OREGON

JACKSONVILLE.—Bids will be received until Oct. 15 for $500,000 in road bonds of Jackson county.

PORTLAND.—The Northwestern Electric Co. will erect a power station. Plans call for a two-story concrete structure estimated to cost $15,000.

PORTLAND.—The plant of the Columbia Creosoting Co., 12 miles from here, on Willamette slough, has been destroyed by fire with a loss of $25,000. Manager R. W. Green says it will be rebuilt and enlarged at once.

PENNSYLVANIA

CAMP HILL.—G. W. Ensign Inc., has been incorporated; bridges, etc.; $20,000; by G. W. Ensign, A. M. Bowman, W. A. Pitts and G. D. Cock, Camp Hill.

ERIE.—The Erie & Pittsburgh Railway Co., Pennsylvania Lines, has announced it will erect a steel and concrete freight station, 40 x 300 feet, at Erie, Pa. Steel cranes and freight handling machinery will be needed.

ERIE.—The Henry Shenk Co., Erie, Pa., has given the contract for buildings for the Northwestern Supply Co., distributors and shippers of iron pipe and machinery supplies. The main building is to be steel construction, three stories, 50 x 180 feet.

FRANKLIN.—The Franklin Rolling Mill Co. recently completed plans for a new plant to replace the one destroyed by fire last spring.

JOHNSTOWN.—The Cambria Steel Co. has ordered a 6,000-kilowatt generator set from the Allis-Chalmers Co., Milwaukee, for installation in the power plant.

LEWISTON.—The M. & M. Sales Co. has been incorporated; metal cut outs; $10,000; by G. K. McClintic, C. A. Witter, Lewiston; I. E. Musser, Yeagertown; R. H. Lewis, Wilkesbarre.

PITTSBURGH.—The Ohio & Pittsburgh Milk Co. has ordered a 150 horsepower gas engine to operate a refrigerating plant from the Pittsburgh office of the Bruce-Macbeth Engine Co., Cleveland. The installation will be equipped with variable speed control.

PITTSBURGH.—The Franklin Metal Bed Co. has been incorporated; $25,000; by G. Noell, H. Rash and S. J. Segal, Pittsburgh.

PITTSBURGH.—The Armstrong Cork Co. recently completed plans for the improvement and enlargement of its power plant. Estimated cost, $38,000.

PITTSBURGH.—The Keystone Shock Absorber Co. has been incorporated; $5,000; by R. Leinhard Jr., J. McNeil, Timothy French and F. Nuttleman, Pittsburgh.

PITTSBURGH.—Foundations of a 60 x 125 foot addition to the foundry department of the Epping-Carpenter Pump Co. have been completed, and the structural steel work will be commenced this week. A 20-ton electric traveling crane and a 1-ton wall crane will be installed.

PITTSBURGH.—The Riter-Conley Mfg. Co. has received a contract from the Porto Rico Construction Co. for a penstock for power house No. 2. Material will be knocked down and nested for shipment to Porto Rico. The Riter-Conley interest also has received a contract for a fuel oil storage tank, 106 feet in diameter and 32 feet high, from the Bureau of yards and docks, United States navy, Washington, D. C. The contract involves about 250 tons of steel.

SCRANTON.—The General Automatic Meter Co. has been incorporated to manufacture, sell and deal in adding machines; $1,500,000; by L. Mullen, W. Hundley, Scranton, and W. I. N. Lofland, Dover, Del.

SHARPSVILLE.—Additions to plant of the Valley Mould & Iron Co. have been started. A new steel building 40 x 250 feet is to be put up, with modern equipment, new trestles and sand sheds.

TENNESSEE

CHATTANOOGA.—The Walsh & Weidner Co. has the contract for the installation of six 250-hp. boilers in the large saw mill of the Great Eastern Lumber Co., Savannah, Ga.

CLEVELAND.—The Cleveland Woolen Mills plans to enlarge its mill, and will need new looms and other machinery.

COLUMBIA.—The Columbia Bank & Trust Co. will erect a mercantile building which will be equipped with a steam heating plant and electric elevator.

GALLATIN.—The Gallatin Machine Co. suffered the loss of its equipment in a fire which destroyed a large part of the business section last week. Loss, $3,000.

KNOXVILLE.—The Catrons Creek Coal Co. has increased its capital from $40,000 to $75,000.

MORRISTOWN.—The Holston Mfg. Co., Lenoir, N. C., plans to erect a factory here estimated to cost about $50,000.

TEXAS

BEAUMONT.—The grain elevator of the J. Miller Co. was recently damaged by fire. Loss $20,000.

HOUSTON.—The Southern Engine & Pump Co., successor to the Southern Gas & Gasoline Engine Co., newly incorporated, has a capital stock of $40,000. It was stated incorrectly that the capital was $10,000.

WASHINGTON

AUBURN.—The Auburn Ice & Cold Storage Co. has just been incorporated for $40,000, and it is planned to erect an ice and storage plant. A. T. and Roland Eliott and others, incorporators.

MONROE.—Bids are now being received with no date set by the board of managers of Washington state reformatory for one blower and one exhauster with motor control and drive gear, one air washer with circulating pumps, humidostat, etc., one unit tempering coil, two units reheating coils and 320 registers of special design. Plans may be had of Saunders & Lawton, Alaska building, Seattle.

PROSSER.—Contract for a 235-foot steel span bridge near here was awarded to Security Bridge Co., Minneapolis, at $12,490.

PROSSER.—The council has adopted an initial resolution calling for 4,000 feet of 8-inch and 6-inch sub-trunk and lateral sewer.

RAYMOND.—The combination mill of the Southwestern Manufacturing Co. has been burned to the ground with a loss of $150,000. Insurance $100,000.

SEATTLE.—The Seattle Lighting Co. has finished plans for coke ovens to cost $50,000.

SEATTLE.—Plans for an enlargement of the shops and wharf of the Seattle Box Co. are under way.

SEATTLE.—The Pacific Coast Coal Co. has started erection of a $250,000 briquetting plant at its mines near Renton, Wash., en-

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tirely of steel and concrete. The Malcolm Briquet Engineering Co., Chicago, will build the plant.

SEATTLE.—The port commission has awarded contract for designing electrical equipment for new cold and warm storage warehouse to Herbert C. Moss, White building.

SEATTLE.—Articles of incorporation have been filed for the Pacific Steel & Casting Co. with a capitalization of $2,000,000. R. Griffin and C. Dell Floyd, incorporators.

SEATTLE.—Fire has destroyed the boxboard mill of the Pacific Board & Paper Co. under lease to the Boxboard Co., with a loss of $75,000. Officers say it will be rebuilt.

SPOKANE.—The Ferguson Auto Spring Mfg. Co. has been incorporated; $1,000,000; by F. W. Stephens and others.

SPOKANE.—The Alliance Mining Co. has been incorporated for $1,500,000 by C. M. Hansen and J. W. Buckley and others.

SPOKANE.—Articles of incorporation have been filed by Fred C. Dahlin, Chas. I. Whipple and others for the Automatic Pump Co. with a capitalization of $200,000.

SPOKANE.—The plant of the Northwest Harvester Co. will be doubled following arrangement made with Holt Mfg. Co., of Stockton, Cal., for making the Holt harvester in Spokane.

TACOMA.—The Northern Woodenware Co. plans to begin construction work in the near future on a $100,000 factory. J. W. Brokaw, president.

TACOMA.—The Sumner Iron Works, Tacoma and Everett, has contract for furnishing machinery in new shingle mill for Mr. Kuntz, at Arlington.

TACOMA.—The Nisqually-Russell Car & Locomotive Works, Tacoma, is soon to build a 30 x 220-foot frame building for woodworking machinery and the manufacture of logging cars. Machinery for the latter purpose will be added to the present equipment.

TACOMA.—The Electric Logging Co., which has been operating near Tacoma, will store its equipment with the Nisqually Iron Works at Tacoma until it is sold. It consists of 6 donkey engines, seven miles of railway track, camp equipment and loggers' tools.

WENATCHEE.—With a capitalization of $500,000 work will begin soon on the plant for the Wenatchee Refrigeration & Packing Co. The incorporators are C. W. Stelzreid, H. I. Knox and M. Morgan.

WEST VIRGINIA

CEREDO.—A $45,000 bond issue was recently voted for a steel viaduct bridge across Jordan's creek. Address J. O. Marcum, mayor.

GRAFTON. — The plant of the Columbia Tile Co. was recently damaged by fire. Estimated loss, $100,000.

WHEELING.—The Wheeling Steel Castings Co. has fired the new 20-ton open-hearth steel furnace at its plant in Warwood. The company is manufacturing a general line of mill castings.

WISCONSIN

APPLETON.—The International Gas Engine Co. of Cudahy, Milwaukee county, is constructing a 200-horsepower oil engine of the Diesel type for the municipal waterworks plant at Appleton.

ASHLAND.—The Minneapolis, St. Paul & Sault Ste. Marie Railway Co., (Soo Line) is making plans for the construction and equipment of an ore dock costing $1,000,000 at Ashland harbor, in 1914. The dock will be of concrete and steel construction.

BEAVER DAM.—The Beaver Dam Malleable Iron Range Co., one of the largest producers of ranges in the world, is about to commence an extensive building scheme which will consume the entire winter months and probably run well into the coming summer. Plans and specifications now in the hands of contractors call for buildings which will nearly double the capacity. Among the additions will be a two-story brick structure, 74 x 65 feet; a wing, 60 x 35 feet, to the warehouse; a new shipping room, all of which will be erected at once. For next year the plans call for a new muffle furnace for processing polished castings, additional foundry accommodations, and a large building for general purposes. The extensions will mean an investment of more than $85,000. The company now employs 500 men, and at present is doing the largest volume of business since its establishment.

EAU CLAIRE.—The Laursen Automatic Pump Co. is installing two Laursen pumps in the plant of the Merrillan Milling Co., at Merrillan, Wis., and is now working on a contract for pump of 360,000 gallons capacity for the Green Bay & Western Railway Co., at Merrillan.

FOND DU LAC.—The Bonduel Feed & Light Co., Bonduel, Fond du Lac county, has been chartered by the secretary of state to build and operate a mill-feed plant and use the power equipment for commercial electric lighting and power purposes. The corporation has a capital stock of $10,000. The incorporators are R. C. Wendt, Adolph Spengler and John Westfall.

GREEN BAY.—The Green Bay Oil & Gas Co., capital $30,000, has been organized by T. B. Silverwood, George Snavely and John Fredericson and is chartered by the state of Wisconsin.

LA CROSSE.—The Chicago, Milwaukee & St. Paul will expend $40,000 in rebuilding its roundhouse, repair shops and terminal facilities at North La Crosse.

LA CROSSE.—The Chicago Steel Tape Co., of Chicago, which some months ago moved its works to La Crosse, following the purchase of a major interest by W. S. Woods, of La Crosse, has been organized as a Wisconsin corporation with a capital stock of $100,000. Mr. and Mrs. Woods and Otto Bosshard, attorney, La Crosse, appear as incorporators. The company is operating a good-sized shop and is producing surveyors' supplies, railway accessories and a general line of steel tape goods.

MADISON.—A cold storage plant costing from $150,000 to $200,000 is proposed by a group of Madison capitalists who are now organizing a corporation and have taken options on a site on East Washington avenue, near Main street.

MILWAUKEE.—The Standard Bedding Co. recently completed plans for a five-story, 60 x 120-foot concrete factory.

MILWAUKEE.—The American Brass Foundry Co. recently increased its capital from $5,000 to $12,000, to make possible the purchase of additional equipment.

MILWAUKEE.—The Smith & Post Co., 1125 Thirty-second street, Milwaukee, manufacturer of general machinery, has changed its corporate title to Smith Engineering Work and at the same time increased its capital stock from $100,000 to $200,000. The company has plans under way for greatly extending its activities and will do some new construction work in 1914. The additional issue will, however, be devoted principally to taking care of the increased business.

MILWAUKEE. — The Wisconsin Telephone Co. of Milwaukee has appropriated $200,000 for the construction early in 1914 of an 8 to 10-story steel and brick telephone exchange building. Other appropriations for 1914 new work made at the annual meeting are: Milwaukee exchanges, $34,000; North Milwaukee, $7,000; West Allis, $21,000; Beloit, $42,000; Fond du Lac, $3,000; Madison, $5,000; miscellaneous, $10,000. The work will consist principally of new switchbords, cables, conduits and transmission lines.

OSHKOSH.—Milwaukee capital has become interested in the Oshkosh Pneumatic Hub Co.'s invention and has made a proposition to pay $20,000 in cash and an equal amount in stock in $100,000, which it is proposed to organize at Milwaukee, in exchange for the exclusive rights to manufacture the device. The offer is under consideration. The pneumatic hub is designed for automobile wheels and was invented by Joseph Laus Jr., of Oshkosh, who recently organized the Oshkosh Pneumatic Hub Co., with $20,000 capital.

PALMYRA.—At a special election it was voted to issue $20,000 worth of bonds to provide funds for the construction and equipment of a municipal waterworks plant.

PORT WASHINGTON.—The Gibson Mfg. Co., manufacturer of gas engines, recently increased its capital stock from $120,000 to $240,000.

RACINE.—The Harvey Spring Co., manufacturing springs for wagons and automobiles, has increased its capital stock from $5,000 to $300,000. The company recently completed a large new plant.

RACINE.—Frank L. Mitchell, treasurer; Otto C. Friend, sales manager, and W. H. Armstrong, assistant secretary of the Mitchell-Lewis Motor Co., Racine, have organized the Mitchell-Lewis Co., capital $10,000, as an auxiliary sales proposition for the automobile factory.

ST. CROIX FALLS.—Harry D Baker, of this city, and Ray Stannard Baker, of New York, are organizing a company to develop a large hydro-electric power transmission project at Balsam Lake, Wis. The site is on Balsam river, between Apple river and Balsam lake.

WEST ALLIS. — The Davis Mfg. Co., builder of automobile motors, recently purchased a site of seven acres, upon which it plans to erect a motor plant estimated to cost $150,000.

ALASKA

JUNEAU.—The commission is considering advisability of erecting a steel suspension bridge over Gastineau channel connecting Juneau and Douglas.